

MOTOR AGE

FOR AUTOMOTIVE SERVICEMEN

FEB 10 1941

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THIS ISSUE

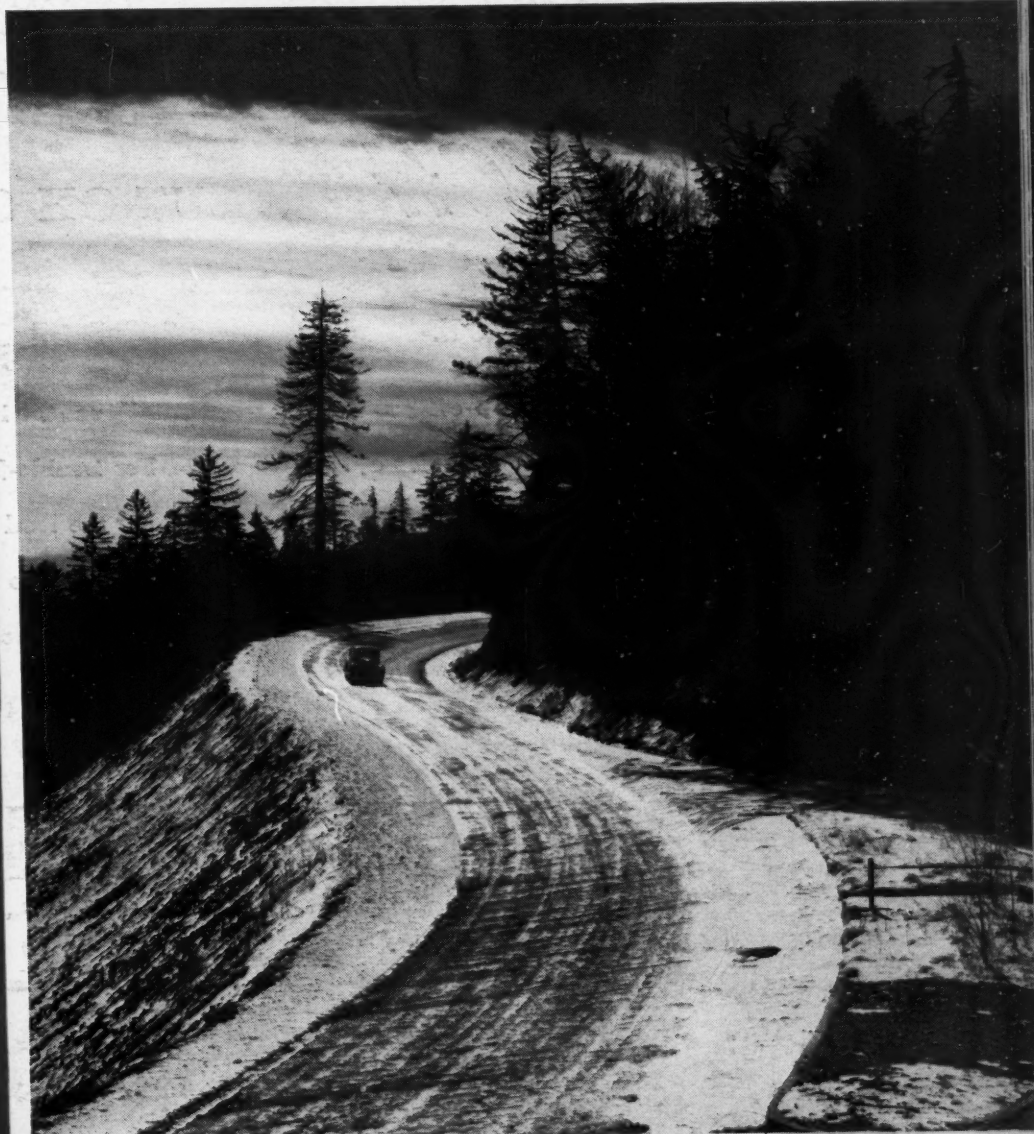
•
There's No Mystery
Fast Charging
Bill Toboldt

•
Rasp Radial
Engine Service
Bob Hankinson

•
Easy Maintenance
The '41 Nash

•
Servicing Two-
Wheel Rear Axles

•
Hundreds of Other
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Ideas



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● Steel-Vent's ability to stop oil-pumping and check cylinder wear under all sorts of cylinder conditions has won the acclaim of the trade.

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Table of Performance:

Model No.	Description	MAX. PRESSURE (PSI)	MAX. FLOW (GPM)	MAX. TEMPERATURE (°F)
S.A.S. 10	10 GPM	100	10	100
S.A.S. 20	20 GPM	200	20	200
S.A.S. 30	30 GPM	300	30	300
S.A.S. 40	40 GPM	400	40	400
S.A.S. 50	50 GPM	500	50	500
S.A.S. 60	60 GPM	600	60	600
S.A.S. 70	70 GPM	700	70	700
S.A.S. 80	80 GPM	800	80	800
S.A.S. 90	90 GPM	900	90	900
S.A.S. 100	100 GPM	1000	100	1000

THESE RATINGS ARE BASED ON A 100% DUTY CYCLE AND ARE NOT TO BE EXCEEDED. ALEMITES ARE DESIGNED TO LAST FOR YEARS OF SERVICE.

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ALEMITE DIVISION
STEWART-WARNER CORPORATION

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NEW COLORS

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Improvements in 1941 Alemite cabinet design and construction are far too numerous to list individually in this space. You must see them to appreciate fully their beauty—their ruggedness—their convenience features. New color combinations give them more selling appeal than ever! SEE THESE FOUR AMAZING NEW ALEMITE LINES NOW!

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STEWART-WARNER CORPORATION

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IT'S not news any more to say that Alemite leads the parade for the new year. That's what the industry expects. *But it IS news* that Alemite—for 1941—offers, not one, but **FOUR** great new lines of lubrication equipment—to meet *every* requirement of *every* size shop!

And it IS news that because of three brand new Alemite developments, Alemite's 1941 equipment *out-performs anything else* that has ever been presented in this field.

And it IS news that this performance is guaranteed, specifically, in writing—in pounds and minutes and temperatures. After lubrication equipment is installed in your shop, *you can't wave the salesman's enthusiastic conversation at the manufacturer* if you're disappointed. But when the salesman's promises are set down in writing, and signed by the manufacturer, you *know* it means business!

Dyn-a-matic Primer and Aldura Valve

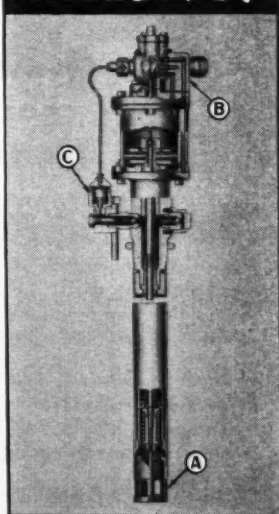
—and, The Alemite Hose Miser!

There has never before been anything like the new Alemite Dyn-a-matic Primer. (A) It leaves nothing to hope—nothing to chance—nothing to good luck. As the grease piston rises, it creates a vacuum, at the same time lifting the primer valve upward, forcing trapped lubricant positively into the priming chamber. Dyn-a-matic priming is a matter of mechanical certainty. The pump *can't* run wild!

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EXCLUSIVE!



Cross section of Super De Luxe High Pressure Pump.

ALEMITE

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MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

MOTOR AGE

With Which is Combined **AUTOMOBILE TRADE JOURNAL**

FOR AUTOMOTIVE SERVICEMEN

Vol. LX, No. 3

February, 1941

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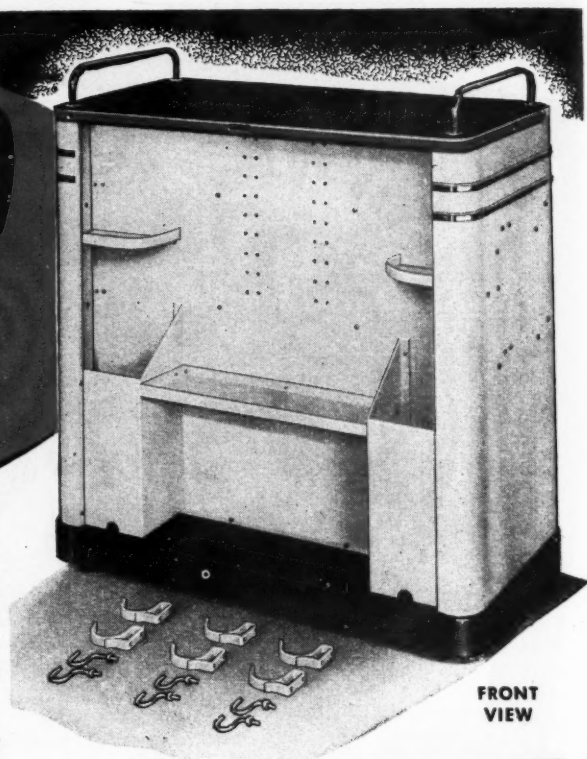
PORTABLE

SERVMOBILE

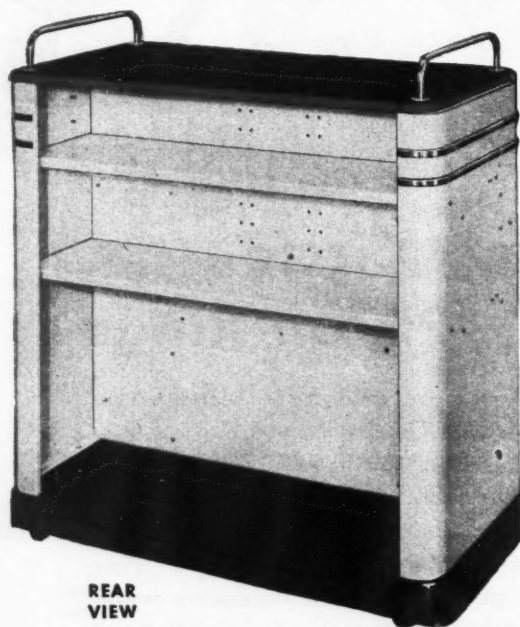
A TOOL RACK AND
UTILITY CASE ON WHEELS

Lincoln again pioneers by introducing a new streamlined service unit which provides handy systemized storage space for tools, wrenches, grease guns, oil cans, spring sprays, parts, fittings, funnels, measures, and other items which are often scattered around an otherwise tidy department.

The Lincoln Servmobile is designed to "clean up" service departments, and has sales appeal that will impress the car owner with the shop's modern equipment for quick, clean, time-saving service. They are of all steel construction and ruggedly built to withstand years of hard service. The top is of heavy-gauge steel, covered with a slip-proof rubber mat. Four large swiveling casters give the cabinet easy portability. The entire unit is finished in lustrous white baked enamel with a red top, gleaming stainless steel trim, chrome plated handles and a glossy black base that reflects Lincoln's high standards of leadership.



FRONT
VIEW

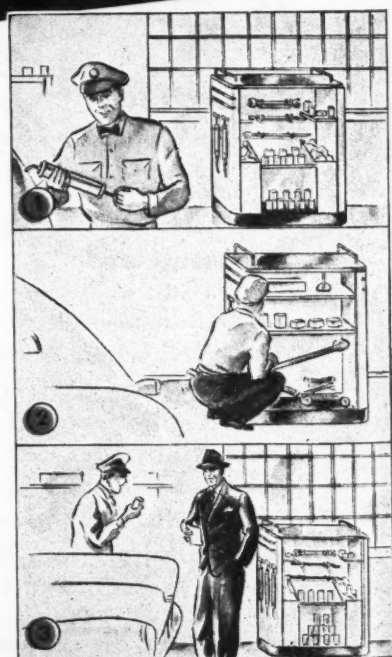


REAR
VIEW

1 Front view, showing brackets attached for holding shackle bar, lug wrenches and other tools. Provision is made on each end for hand gun brackets, should they be desired.

2 Rear view, showing storage shelves for fender and seat covers, wheel bearing packer and various items which should be in easy reach. Lower portion is an ideal storage space for hydraulic jack, special greases, battery water, etc.

3 The Servmobile is also an ideal "moving show-case" for quick sale items such as brake fluid, polishes and accessories.



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LINCOLN ENGINEERING COMPANY

Pioneer Builders of Engineered Lubricating Equipment

ST. LOUIS, MO., U. S. A.

MOTOR AGE

FEBRUARY 1941



Shop Talk

By *Bill Toboak*

Tripper

It is important to guard against being tripped by competition, not only when playing hockey but also in the business field. Too often a repair shop operator will spend all of his time worrying about competition and forget about his own business. Figuring out ways and means of getting more customers in the shop, methods of turning out jobs faster and better, what equipment to buy and where to place it to the best advantage are enough to keep any man busy, without worrying about what competition is doing.

Scarcer

There is no kidding about the fact that tools are getting scarcer.

All types of hand tools are getting harder and harder to find. Instruments such as micrometers are bringing premium prices and a mechanic is lucky if he can buy one at any price. Possibly this is only a temporary condition due to the demands of the National Defense Program. But any mechanic with a full set of tools is to be congratulated.

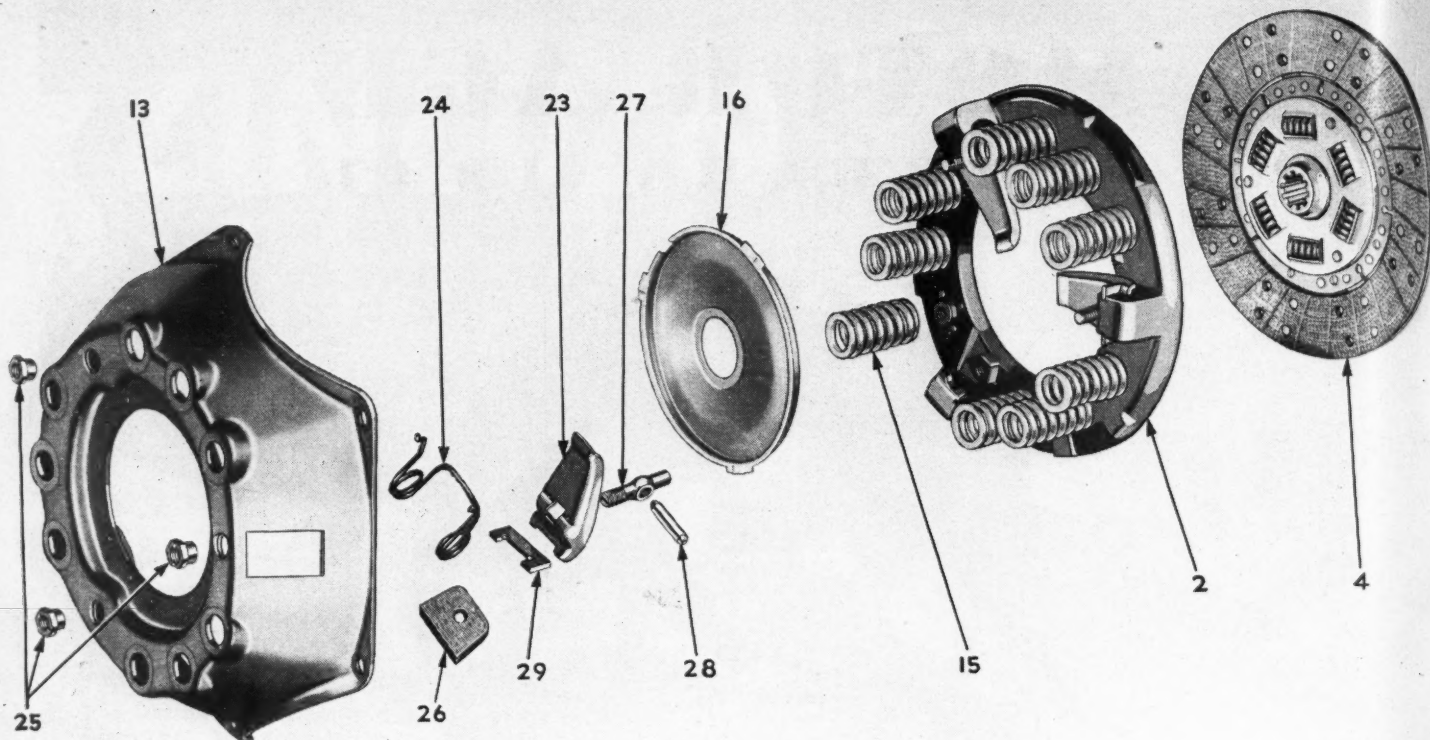
Prosperity

I can't help viewing the future of the automotive maintenance business with the greatest optimism. A trip through any industrial center will show the parking lots around each factory filled to capacity with the cars of the workers. With more workers riding back and

forth to work there will be more need for repairs. In many instances these workers are piling up mileage at a terrific rate, many traveling as much as 100 miles per day. That will mean plenty of all kinds of maintenance, from a simple lube job up to and including major overhauls.

Invitation

Ray Wilbur, up in Manchester Center, Vt., sends an invitation to come up and enjoy the skiing. Says they got the biggest open slope east of the Mississippi river. Thanks a lot, but I've got a lot of editorial skiing to do with a couple of steep jumps ahead (a big April issue in the making)—so I guess you'll have to "include me out" right now.



Details of Plymouth 1941 Clutch. 2—Pressure Plate. 4—Disk Assembly. 13—Clutch cover. 15—Pressure spring. 16—Pressure plate baffle. 23—Release lever. 24—Release lever spring. 25—Release lever eye bolt nut. 26—Driving lug grease pad. 27—Eye bolt. 28—Release lever pin. 29—Release lever strut.

TO remove and overhaul the clutch used on the 1941 Plymouth in the shortest time, remove the clutch release fork pull back spring, the transmission and then clutch housing pan. Then disconnect the release fork from the pivot and pull out the clutch release bearing and sleeve.

To maintain balance mark the clutch cover and flywheel as shown in Fig. 2 and then remove the cap screws holding the clutch cover to the flywheel. The cover assembly and clutch disk assembly can then be removed from the clutch housing.

Reassemble in reverse order taking care to coat the pilot bearing and the end of the clutch shaft with medium short fiber wheel bearing grease. Also make sure that the flywheel and pressure plate are clean and free from grease. A clutch shaft (transmission drive pinion) should be inserted through the driving disk hub and into the pilot bearing in order to secure proper alinement. Clutch cover

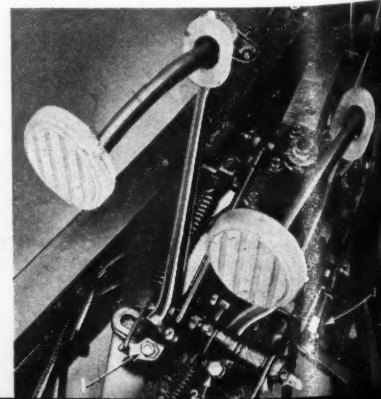
SERVICING THE 1941 PLYMOUTH

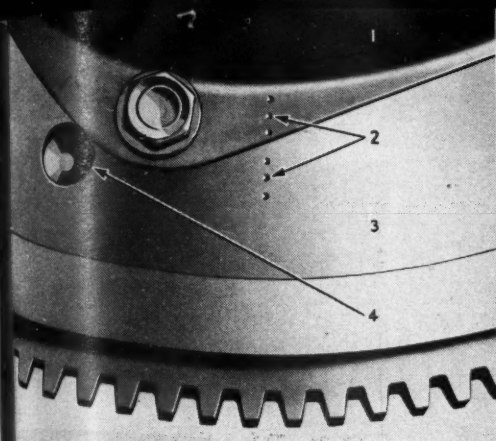
**A step-by-step picture story
you to do the job quickly**

bolts should be tightened to a tension of 15 to 20 ft. lb. with a tension wrench.

Clutch release levers must all be adjusted to the same predetermined height above the machined surface of the pressure plate. This adjustment cannot be made by setting the

(Continued on page 78)

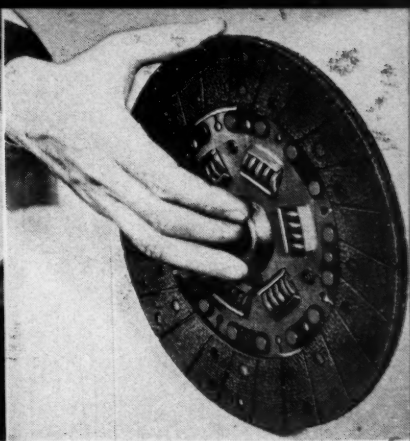
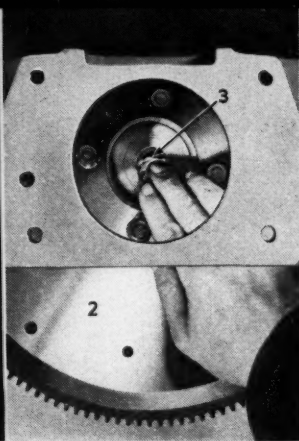




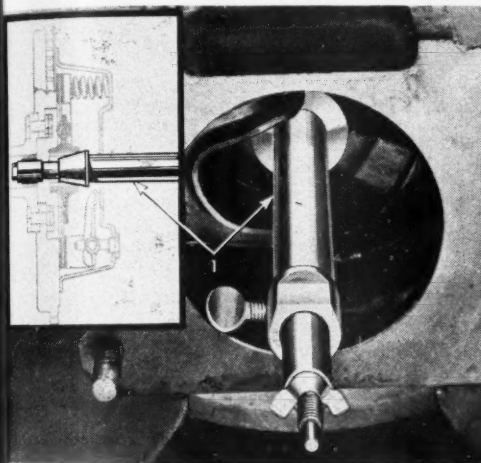
Punch mark clutch cover and flywheel to insure reassembly in original position. 1—Clutch cover. 2—Punch marks. 3—Flywheel.



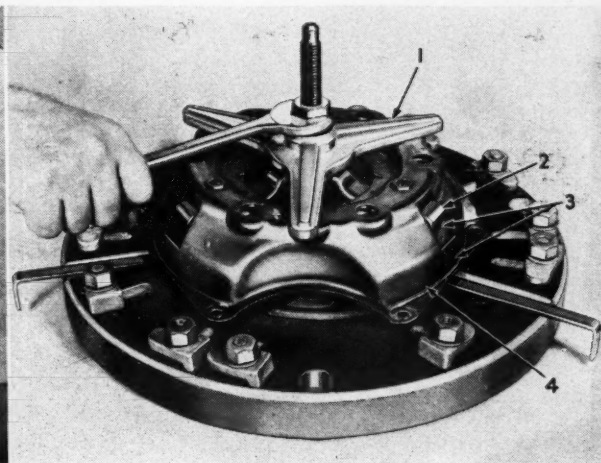
4—Balance drilling. (Left) Clutch friction surfaces must be clean. (Right) Lubricating clutch pilot bushing.



Do not touch friction surfaces of clutch disk with hands. Keep the surfaces clean of dust and oil spots.



Use a special arbor or a spare clutch shaft to align clutch. (Center) Use a special fixture to disassemble, assemble and adjust clutch fingers. 1—Special fixture. 2—Pres-



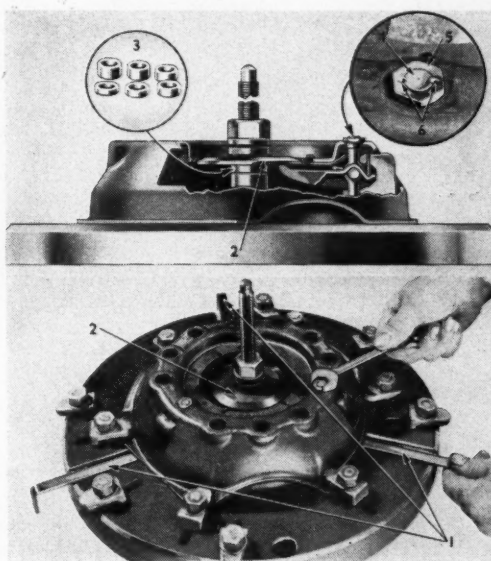
sure plate. 3—Punch marks on pressure plate and cover. 4—Clutch cover. (Right) To remove release levers grasp lever and eye bolt as illustrated, keeping the flat side of the



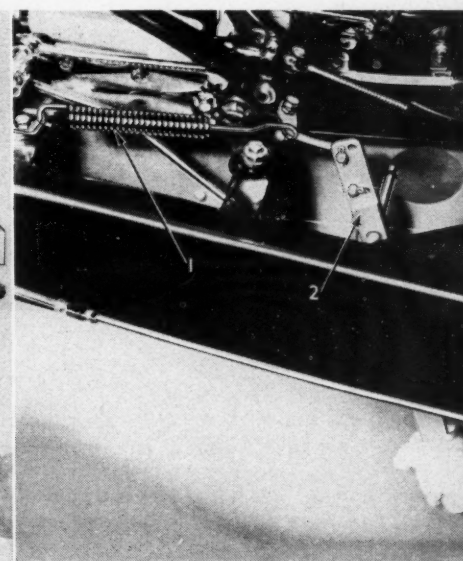
lever and the upper end of the eye bolt close together and so that eye bolt pin is seated. Strut can then be lifted over ridge on end of lever.

Clutch

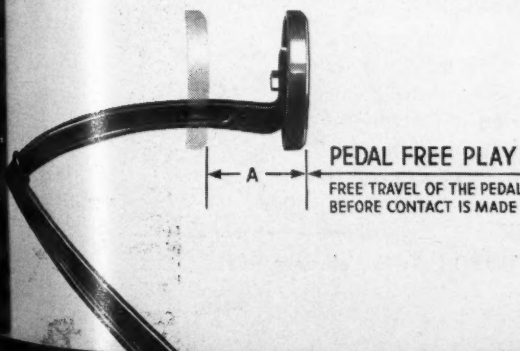
that will help
and accurately



Adjusting clutch release levers on special fixture. 1—Feeler blades. 2—Compression plate. 3—Spacers. 4—Release lever eye bolt. 5—Eye



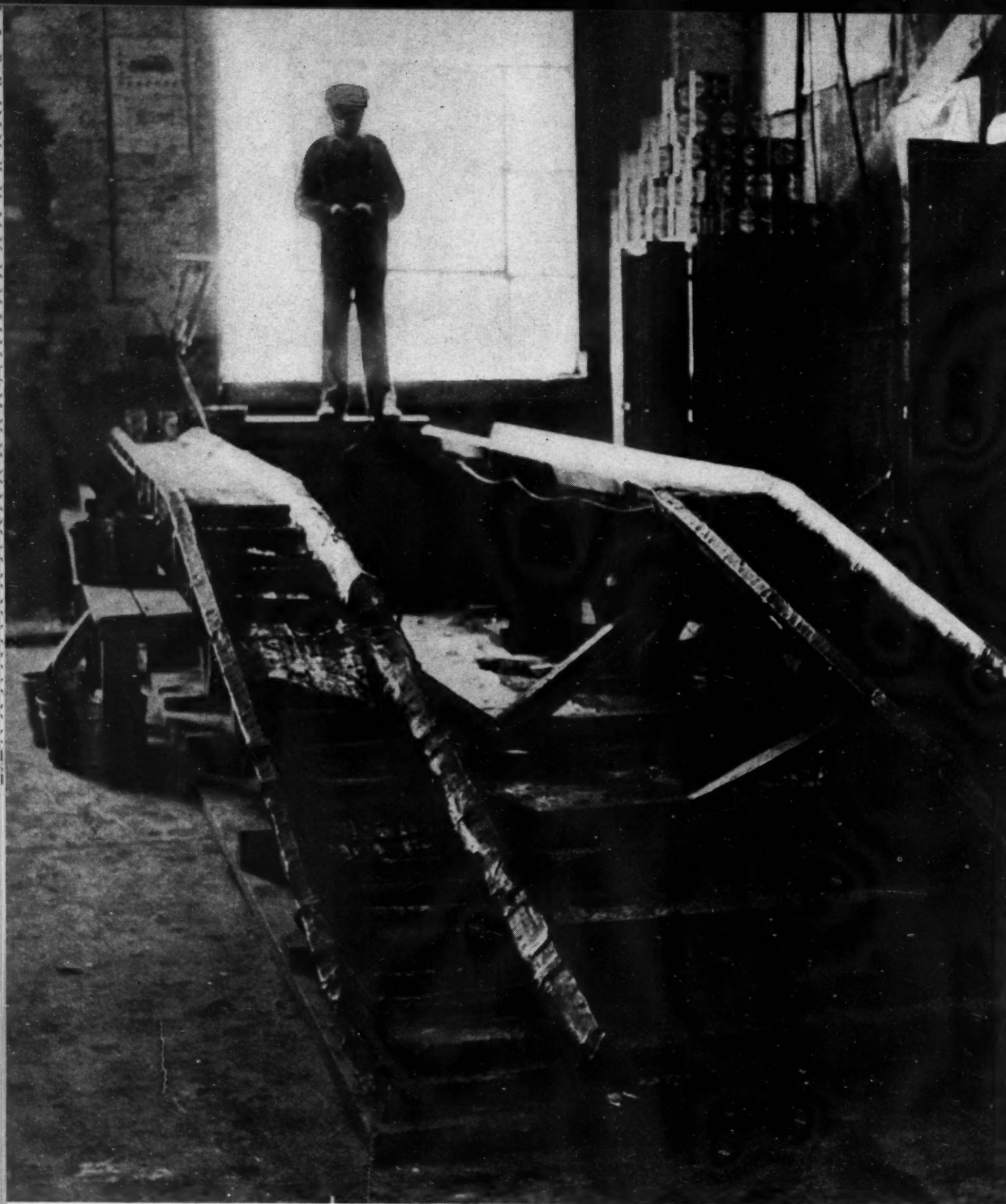
bolt nut. (Right) Using special tool to remove and replace over center spring. Be careful not to stretch this spring.



PEDAL FREE PLAY
FREE TRAVEL OF THE PEDAL
BEFORE CONTACT IS MADE

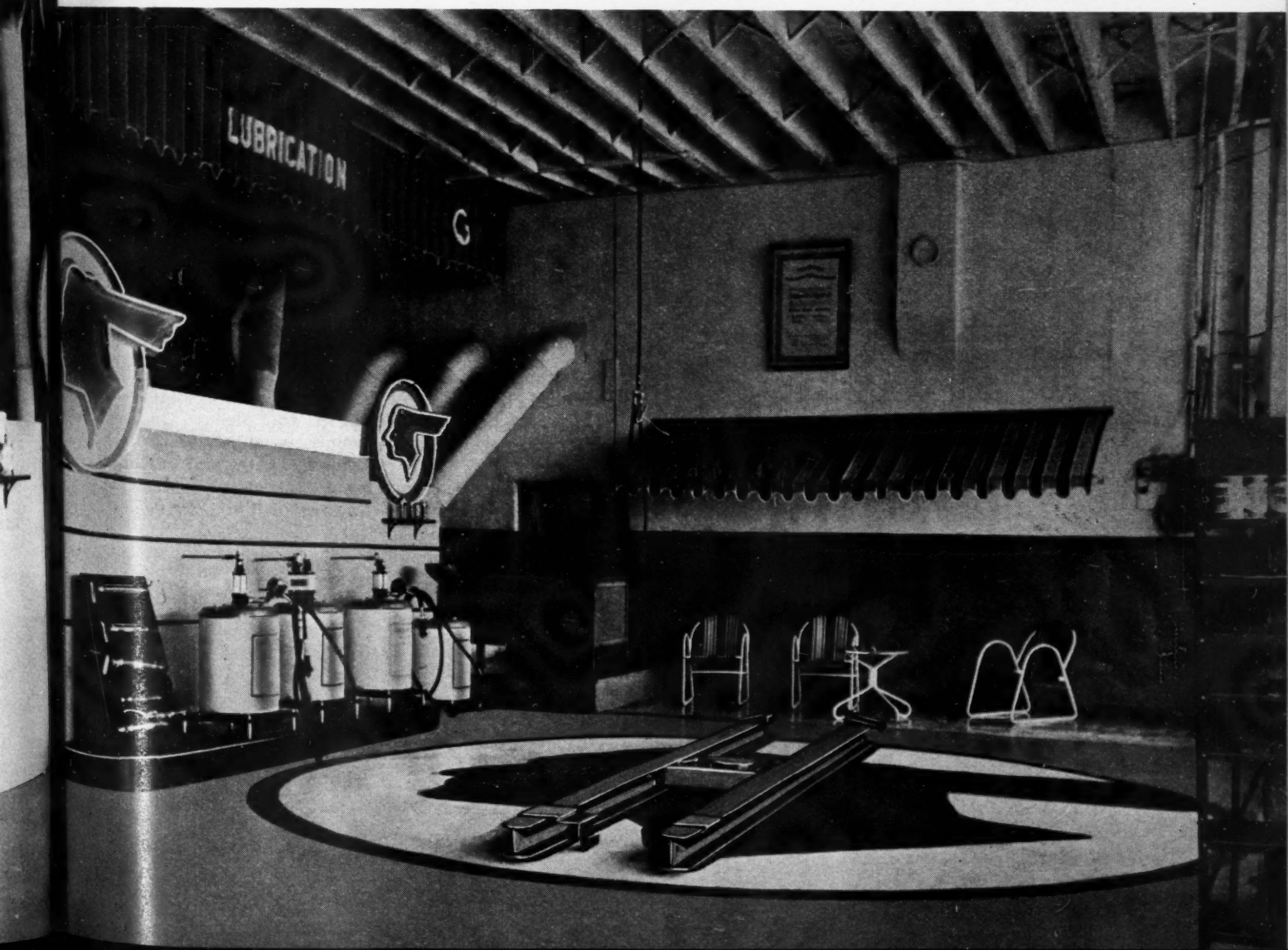
(Left page) Clutch pedal floor board clearance is adjusted by turning stop screw 1 until pedal arm just clears floor board.

(Left) Clutch pedal free movement adjusted by turning adjusting nut 3, Fig. 10, until pedal has 1 inch free travel as at A.



If you had a dollar for every word written about the importance of your shop's appearance as a business builder, you'd be a heluva rich guy—and you probably wouldn't be worrying about how to get more lube business . . . And if, as some old Chinese wisenhiemer put it, a picture is worth 100,000 words (at a buck a word), here are two pictures worth at least \$200,000. While our logic isn't so hot—these pictures do tell a forceful story . . . probably the most important story about selling lubrication ever printed! Believe it or not—these pictures were taken in the same shop! One before—the other after. **Before** waking up to bigger lubrication profits—**after** the business had been given a much-needed shot in the arm with a lot of new equipment. Which one got more business? That's right, you're right! Go thou and do in like manner. **Frank Tighe**

**WHICH ONE
GETS MORE**
lubrication)
jobs!

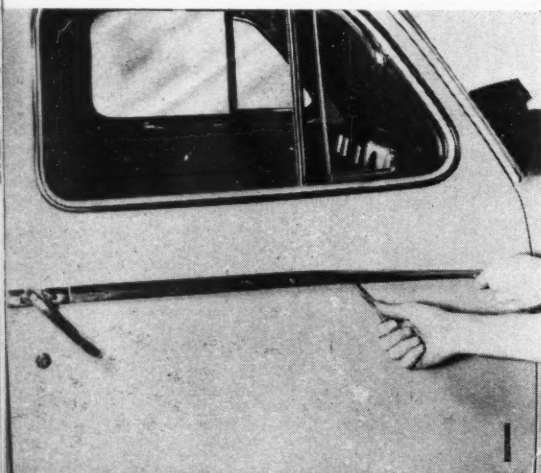
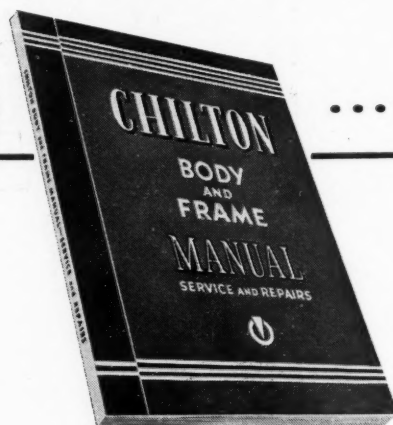


Body Maintenance

ON THE '41 NASH

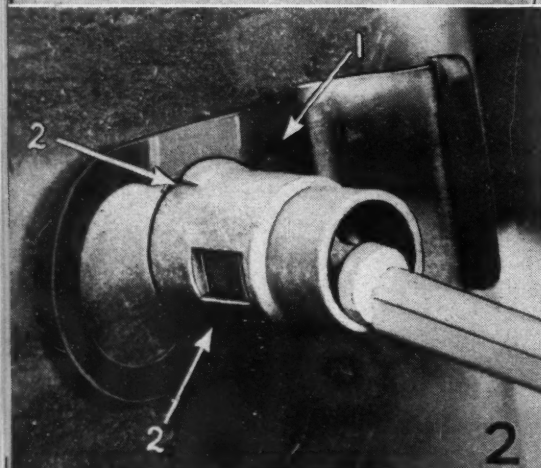
Here's how to remove door locks

... and remote



Door Outside Handle Removal

Remove belt molding (some models) by prying up with screw driver, Fig. 1. Turn handle down and remove 2 screws holding handle to door. Handle can then be pulled off. When installing handle, first place it in horizontal position and press on until first tumbler is engaged. Continue pressing and turn to right until second tumbler is engaged. Turn handle down and install screws.



Door Lock Removal

Loosen door sealer rubber (Fig. 3) opposite cylinder lock to expose retaining spring, Fig. 2. With screw driver press retaining spring in against door and pry out about one inch. This will release cylinder lock, permitting removal.

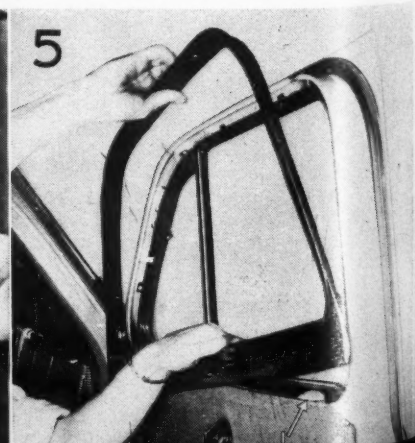
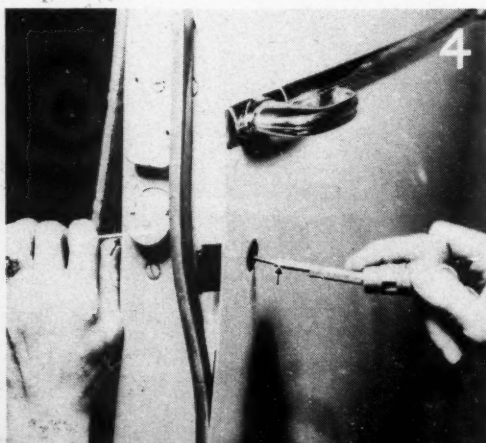
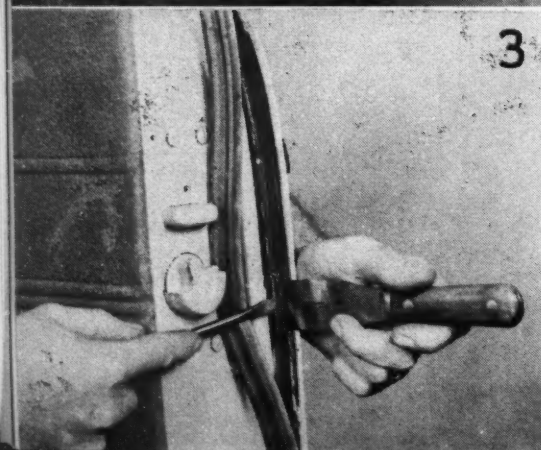
Door Lock Installation

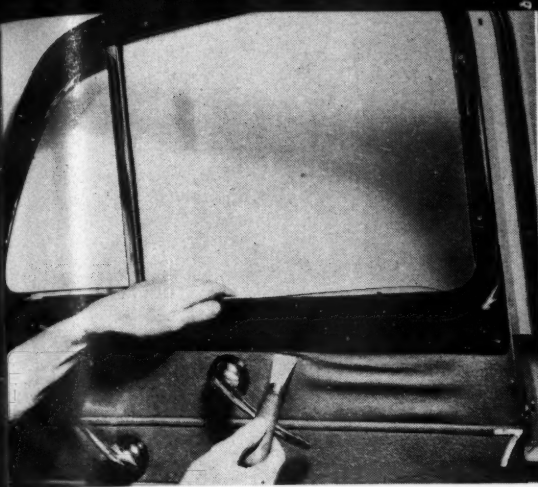
Check locking device on door lock

for unlocked position. From outside of door insert screw driver through hole in door into locking device. Turn to right as far as possible. Turn lock with key to unlocked position. Align cylinder lock retaining spring with hole in door outer panel. Guide the square shaft of cylinder lock into door lock using long needle or stiff wire (Fig. 4). Then, holding cylinder lock in place, depress retaining spring with screw driver, pushing it back into the door and locking the cylinder lock in place. Reseal door sealer rubber.

Door Finish Molding Removal

Lower the window glass and remove all visible screws holding the molding in the door. On rear doors remove pushbutton on locking device. Then pull molding away from the top of door. Then push upward to unhook molding





control assemblies

from door inner panel as in Fig. 5.

Door Finish Molding Installation

Reverse procedure of removal and before tightening screws, lift lip of ventilator weatherstrip over top of finish molding, using a pointed wood wedge, as shown in Fig. 6.

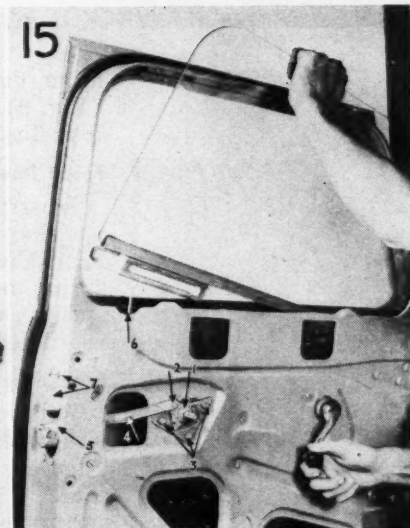
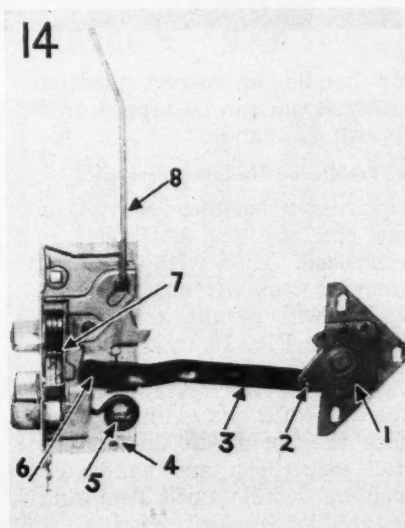
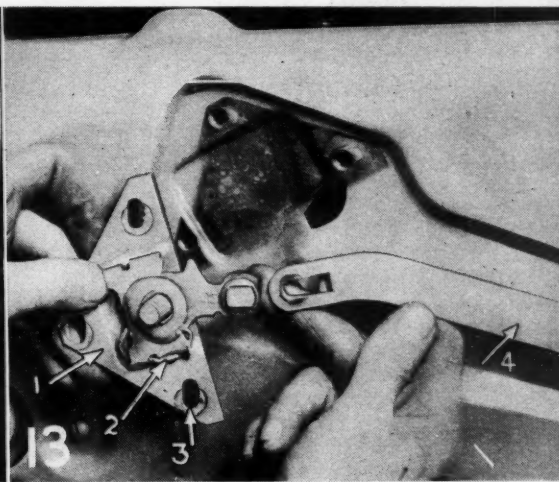
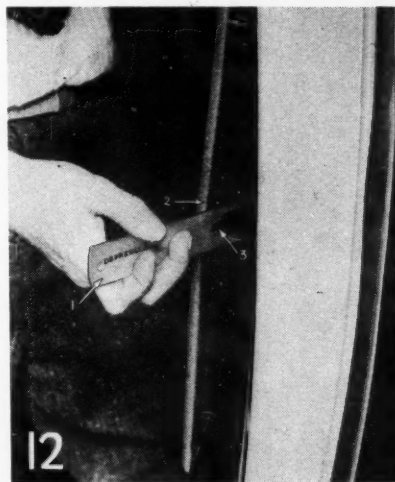
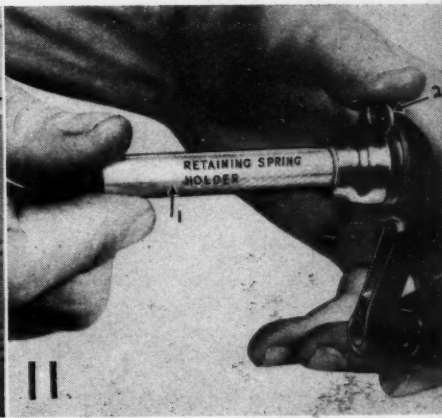
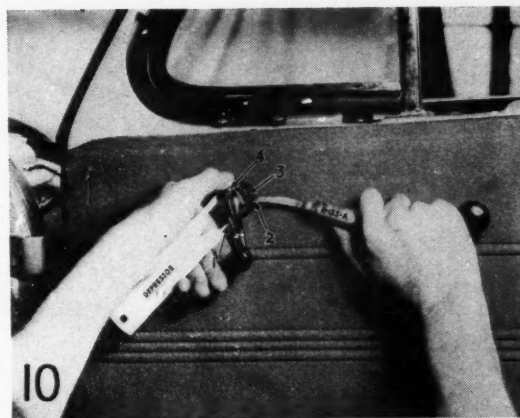
If upholstery wrinkles along upper edge of door trim panel from installation of finish molding, use a putty knife as illustrated in Fig. 7 to straighten upholstery.

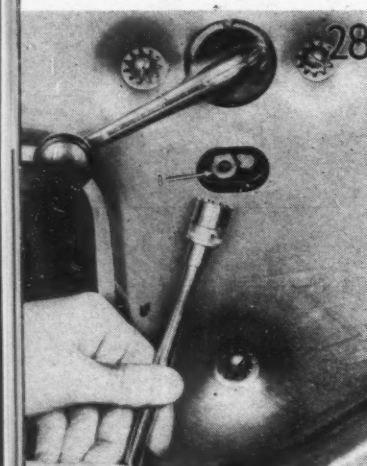
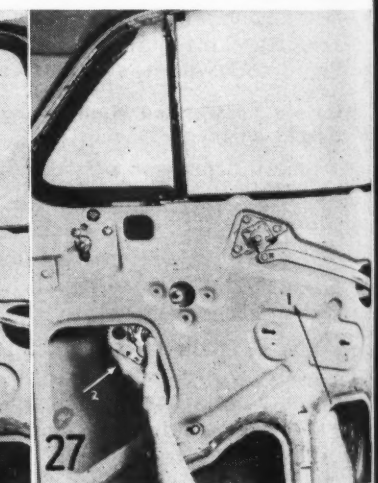
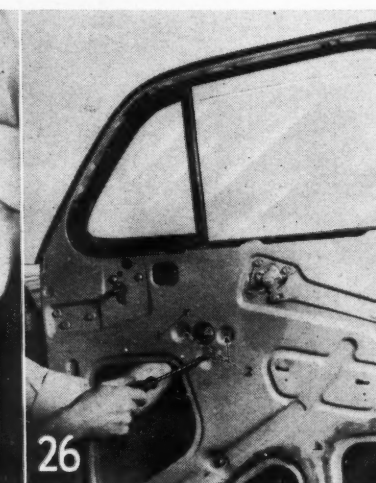
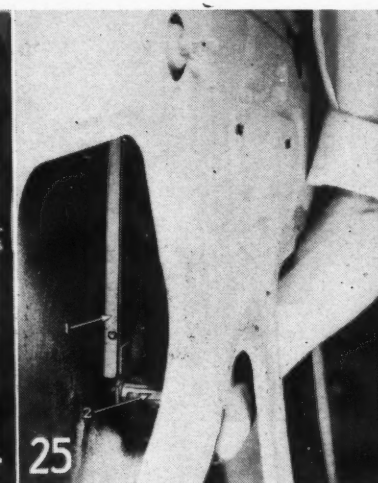
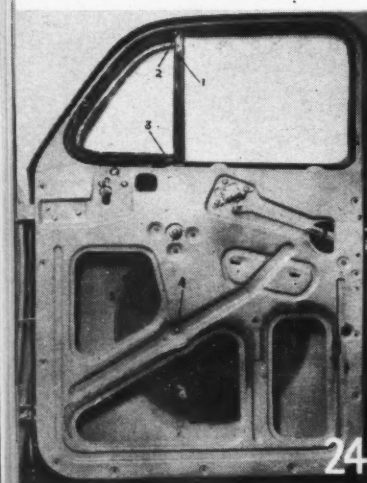
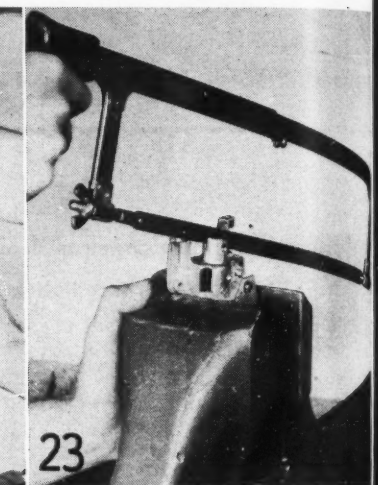
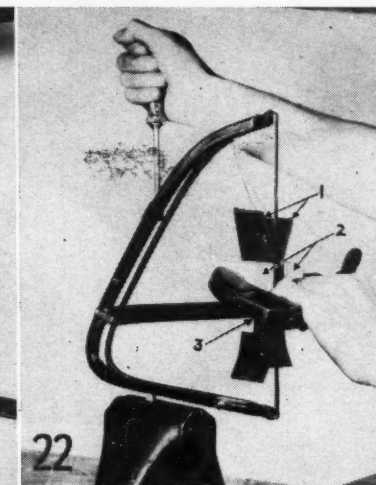
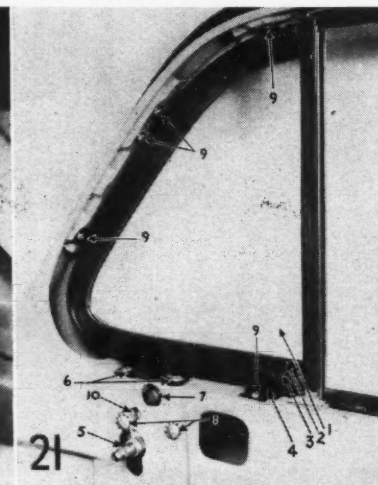
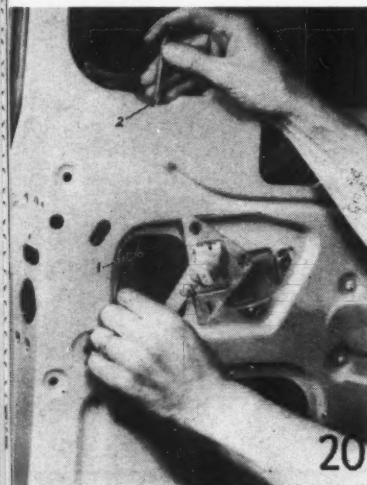
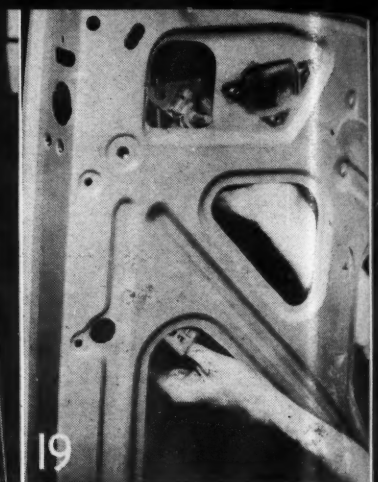
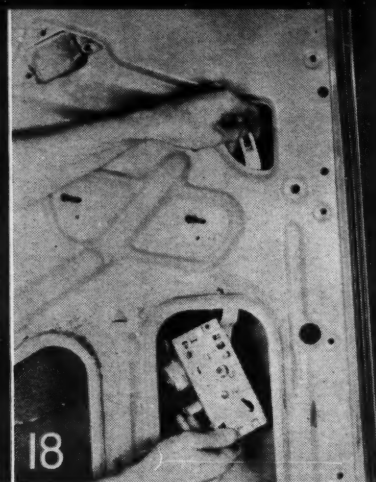
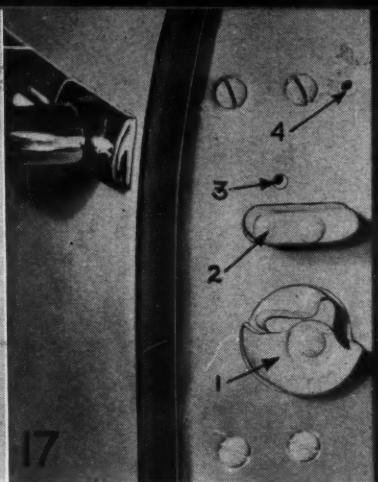
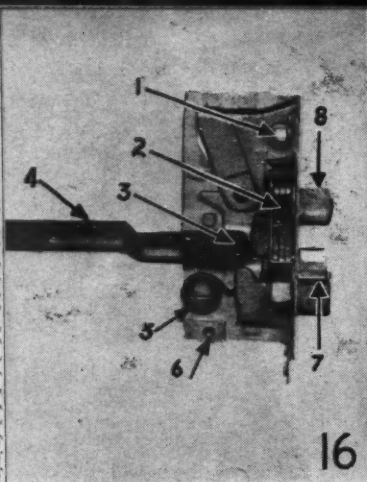
Remote Control and Window Regulator Handle Removal

Insert depressor between handle and escutcheon, exposing locking pin. Drive out locking pin with a long punch, as in Fig. 8.

Remote Control and Window Regulator Handle Installation

Place remote control handles at angles uniform on all doors. Regulator handles are placed pointing down with windows in closed position. Install escutcheon plate on shaft and then the handle in the correct position with locking pin in upper half of handle hole. Press end of handle in against the escutcheon. Using a hammer handle,





drive door handle to correct position (Fig. 9) so that pin can be tapped until it is flush with the handle.

Front Door Ventilator Handle Removal

Insert depressor between escutcheon and handle and pry out until slot in handle is exposed. Then with retaining spring removing tool, lift out retaining spring, which will permit removal of ventilator handle, Fig. 10.

Front Door Ventilator Handle Installation

With the aid of a retaining spring loader, place the spring in the handle. Then install escutcheon and handle on shaft. Push on handle until retaining spring engages slot in shaft, Fig. 11.

Door Trim Panel Removal

Remove finish molding and remote control and window regulator handle. Also remove arm rests. Then use notched tool to lift fasteners from door inner panel, Fig. 12. When installing the trim panel be sure that holes line up with clips, and then press clips in.

Front Door Remote Control Removal

Remove finish molding, remote control and window regulator handles, ventilator handle, arm rest, and door trim. Then remove the three screws (3, Fig. 13) in remote control unit to door inner panel. Turn remote control unit 1 down and disconnect from link 4.

(Continued on page 92)

By **BILL TOBOLDT**

THE calm that had settled over the battery charging business has been completely shattered during the past few months by the advent of new types of chargers, which instead of doing the job in the conventional 24 hours, require less than an hour.

To the old timers in the battery business, a battery, if charged at anything higher than 10 amp., would just naturally curl up and die. Why, the plates would just about go up in smoke! So the amazement of such men on hearing of these new fast chargers using rates of approximately 100 amps. can readily be appreciated.

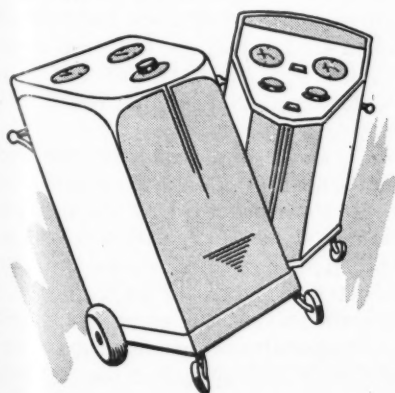
Naturally, the questions arise of just what are these fast chargers and why don't they harm the batteries.

Well, strictly speaking there is nothing radically new in these units. The fast chargers comprise a rectifier, a transformer and the usual instruments for checking the state of charge. In addition, many of them include an automatic time switch which is designed to disconnect the battery at the completion of the time allotted. Of course, the capacity of the unit is higher than the conventional chargers. The maximum charge at the start ranges from about 70 amps. to 150 among the different manufacturers. Naturally the charging rate is automatically tapered or reduced as the battery comes up to charge because of the increased counter E.M.F. On some makes of units



THERE'S NO MYSTERY TO

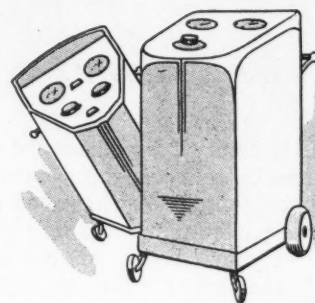
Fast Charging



Here's the dope on the new battery fast chargers—how they work, time required to charge a battery, and the many advantages of this type of equipment

THERE'S NO MYSTERY TO

Fast Charging



this is the only regulation, on others the charge is reduced by means of automatic time switches controlling resistances.

When it comes to the rectifiers, the familiar motor generator and bulb units are used, in addition there are some new comers to the automotive field—copper sulphide, copper oxide and selenium. However, while these three are new to the automotive field they have been used in other industries for years.

Since different makes of fast chargers have different charging rates, the time required to charge a given battery will also vary. The claims made by the different manufacturers range from 20 min. to 1 hr. and 20 min.

While the electrical instruments used on the different makes of chargers vary, most of the chargers are fitted with volt and ammeters to test the battery before and after charging and also to indicate the charging rate.

In this connection it is important to emphasize the necessity for careful checking of the battery to determine whether it will take a charge. While different claims are made by various manufacturers it would seem that in general, a fast charger will charge any battery that can be charged with a conventional charger with the exception of some that are badly sulphated. Such batteries require the familiar long soaking charge.

It is a simple procedure to charge a battery with one of these new units. The condition of the individual cells is first checked by means of a hydrometer and the meters on the charger, the level of the electrolyte is brought up to the desired point and the battery is then placed on charge. The length of the charge is determined by the condition of the battery. Naturally the more discharged a battery is, the longer the charge will be.

Because of the high charging

rate it is important that the electrolyte level be brought up to the desired point. In addition, some manufacturers recommend temperature readings of the battery during the charging period. While the maximum permissible temperature varies with different manufacturers, the average seems to be in the neighborhood of 130 deg.

The value of such temperature readings can be readily appreciated, as they are a direct indication of what is happening within the battery. Any increase in temperature beyond the 130 deg. indicates not only wasted current, but also of even greater importance, possible damage to the plates. However, all the manufacturers state that their equipment when used in accordance with instructions will not cause the battery temperature to raise to a point that would be harmful to the battery.

To the question—to what percentage of capacity will the new equipment charge a battery—many different answers are given by the manufacturers. Values vary from 60 to 80 per cent. But it must be remembered that old batteries can never be recharged to their full rated capacity. However, even though a fast charger cannot recharge a given battery as fully as a slow charger, the merchandising value and other advantages of being able to recharge a battery to a point that it will crank a car are considerable.

A list of the advantages of the fast chargers would include—

1. Less time required for the actual charging. 20 min. to 1 hr. and 20 min. being required to charge the battery.
2. Batteries are charged in the car, thus saving the time required for removal of the battery and the installation of a rental. In general it requires about 10 min. to test and place a battery on fast charge,

but a slow charge, involving the installation of a rental and then the reinstallation of the recharged battery required about one hour.

3. Fewer rental batteries required.
4. Batteries can be charged while the car is being lubricated or while some other quick service is being performed.
5. Useful for bringing battery up to voltage thereby permitting accurate checking and setting of voltage regulators on the car.

However, it must be emphasized that some of the fast charger manufacturers state that their unit does not eliminate the necessity of a slow charger, pointing out that a slow charger is required for maintaining stocks of batteries, for charging new and rebuilt batteries, and for charging certain sulphated batteries.

One of the most frequent questions asked in connection with these new chargers, is why is it possible to charge batteries at such a high rate today when it was considered impossible only a few years ago. First of all battery plates, separators and the complete battery are undoubtedly far superior to what they were only a few years ago. For example, ten years ago the starting capacity of batteries averaged 115 amp. for 20 min.; today the average is 140 amp. So it would seem that a battery that can stand up under a discharge of 140 amp. could be recharged at 70 to 100 amp.

Certainly the batteries can and do stand up under higher charging rates than provided by the conventional "slow" charger, for when installed in cars and trucks the rate is often in excess of 30 amp.

Evidently, by the emphasis placed on temperature, it is not the charging rate, but how hot the battery gets, that is the determining factor.



TEST PROVES HIGH GASOLINE

Economy

Results of 1941 Gilmore Grand Canyon Run

Price Division	Position	Make	Average Miles Per Gallon	Average Miles Per Hour	Average TMPG
A	1	Willys Plainsman*	29.06	42.41	49.624
A	2	Willys Plainsman*	28.40	42.42	47.319
A	3	Willys	25.18	42.40	41.334
B	1	Ford	23.05	43.19	49.557
B	2	Plymouth	21.71	43.22	43.417
C	1	Nash 600*	25.81	42.60	48.651
C	2	Studebaker Champion*	24.61	42.64	45.003
D	1	Hudson 6 De Luxe*	24.96	43.19	50.969
D	2	Mercury	23.35	42.58	50.895
D	3	Dodge	22.47	42.32	43.425
E	1	Studebaker Commander*	24.36	42.84	52.975
E	2	Nash Ambassador 6*	23.16	42.37	51.512
E	3	De Soto	20.04	46.59	42.632
F	1	Studebaker Pres.*	22.53	42.32	51.988
F	2	Nash Ambassador 8*	21.18	42.52	48.579
F	3	Chrysler Royal*	19.71	42.60	44.060
G	1	Chrysler Windsor*	20.14	43.37	44.988
H	1	Packard 120*	19.73	43.41	46.846
H	2	Hudson Commodore 8*	20.18	43.31	45.905
H	3	Chrysler Saratoga	WITHDREW (Minor Accident caused leak in fuel tank)		
	1	Lincoln Zephyr**	22.96	42.91	57.749
	2	Chrysler New Yorker*	17.47	42.63	42.956
J	1	Lincoln Custom**	21.03	44.38	57.827
J	2	Chrysler Crown Imp.*	16.46	42.95	46.265

SWEEPSTAKES WINNERS

First	Lincoln Custom	57.827	TMPG
Second	Lincoln Zephyr	57.749	TMPG
Third	Studebaker Comm.	52.975	TMPG

Legend: TMPG—TON-MILES-PER-GALLON

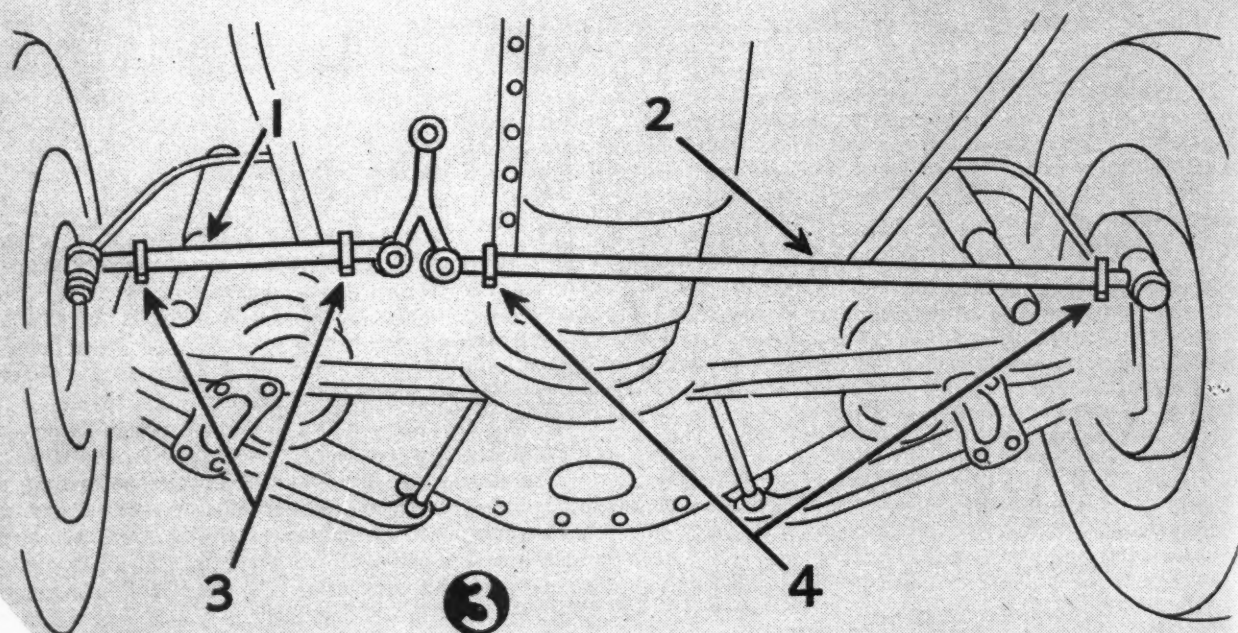
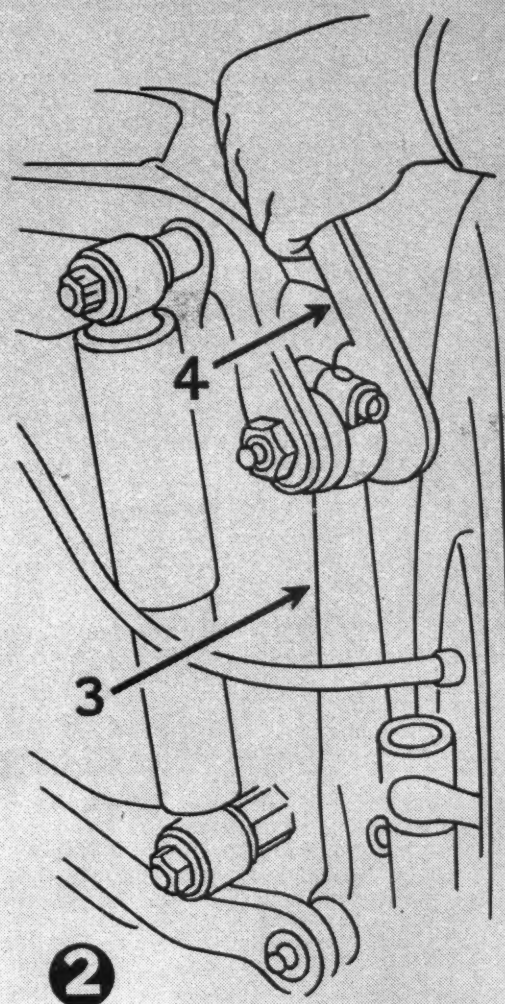
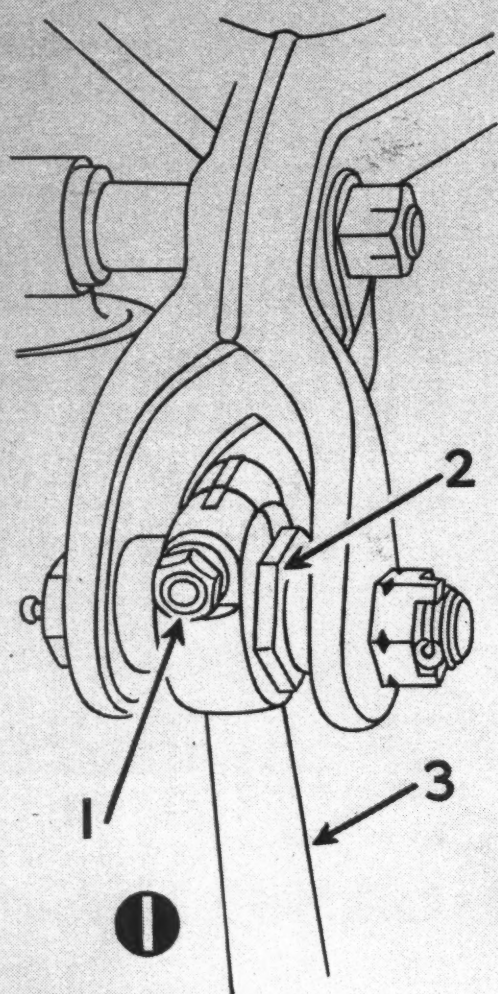
*—Equipped with overdrive transmission

**—Dual overdrive—i.e. Dual ratio axle and overdrive transmission

THE annual Gilmore Economy Run this year followed a route from Los Angeles to the south rim of the Grand Canyon in Arizona, a distance of 595.2 miles. The new route was selected in preference to the former route to Yosemite Park, a distance of 306.5 miles, because it afforded an opportunity to attain higher driving speeds, resulting in fuel performance more closely corresponding to normal touring averages.

The cars were divided into groups according to price class, and the winners of the various groups are shown in the accompanying table. Awards were made on the basis of average ton-miles-per-gallon of gasoline, all cars using Gilmore Red Lion gasoline and Gilmore lubricants.

The Sweepstakes Award, available to the entrants of all divisions, was won by a Lincoln Custom sedan equipped with an overdrive transmission and a dual ratio rear axle, with an average of 57.827 ton-miles per gallon.



DATA ON MODERN

Wheel Alinement

Detailed instructions for setting caster, camber and toe-in on the 1941 Plymouth: front end construction slightly different from previous models

BEFORE checking front wheel alinement on the 1941 Plymouth, be sure that the car is on a level floor and that the tires are inflated to the recommended pressure of 28 lb. front and rear. Grasp the front bumper and move the car up and down several times and then allow it to come to rest. This will permit the front springs and shock absorbers to seek their normal position.

King pin inclination is the amount the king pins are inclined toward the center of the car from a vertical position. Since any change in king pin inclination is due to either a bent frame or a

bent control arm, this point should be checked first, and necessary corrections made by either straightening the frame or replacing the control arms. The king pin inclination angle for the 1941 Plymouth is from $4\frac{3}{4}$ to 6 deg.; the method of checking differs according to the make of equipment available, but in any event this point should be checked first to be sure that there are no damaged parts to the front end.

The caster angle is controlled by the position of a threaded bushing placed over the upper control arm yoke bolt and fastened to the steering knuckle support arm by a clamp

bolt. The bushing should be installed on the bolt so that the upper end of the support arm is centrally located between the ends of the yoke. Turning this bushing so as to move the support arm 3, (Fig. 1) either forward or backward on the bolt will affect the caster angle. Specifications call for the caster angle to be from minus 1 deg. to plus 1 deg.

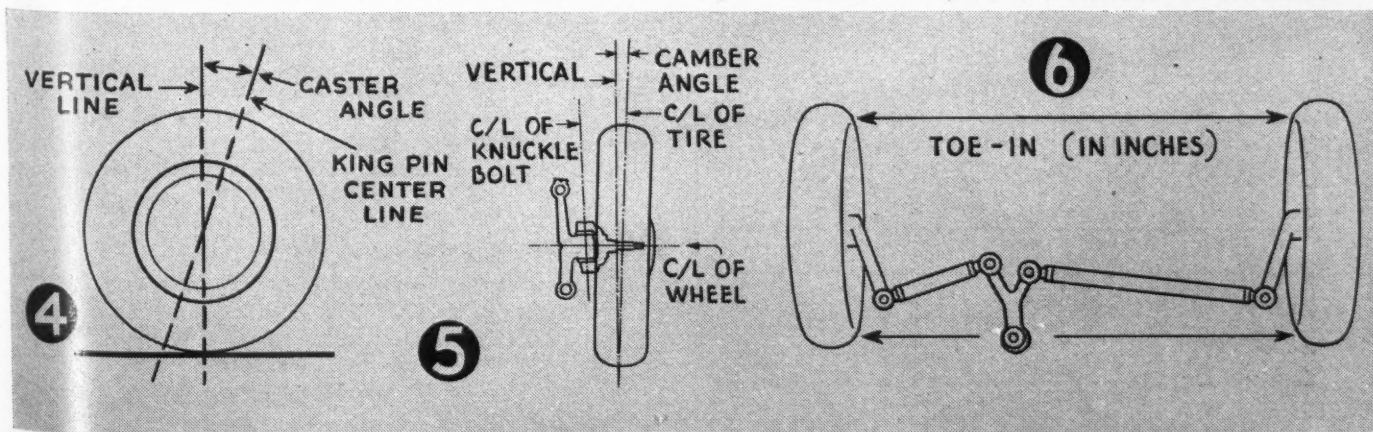
The threaded bushing over the upper control arm yoke bolt is an eccentric bushing. One end of the bushing is formed into a hex nut, 2, (Fig. 1) so that it can be turned on the bolt to adjust the camber

(Continued on page 78)

4—Caster is the backward tilt of the king pin at the top, and is measured in degrees. 5—Camber is the outward tilt of the wheel at

the top, and is measured in degrees. 6—Toe-in is the amount the wheels are closer together at the front than at the rear, and

is measured in inches. Caster, camber and toe-in are closely related, and adjustment of one affects the adjustments of the other two.



By **FRED SLOANE**

SAM Miller hurried down the main street of Greenwood in the direction of his shop. Tonight his regular twice a month meeting with the boys was scheduled. His problem was to teach his help some of the fundamentals of electrical work that they should have been taught in school—but weren't.

Sam found the bright lights on in the Tune-Up corner of the shop and all the boys present. Even Splash, the negro car washer was there. Splash wasn't a mechanic or electrician but he always attended these meetings and got as much kick out of them as if it were a club or lodge meeting. Sam arranged a few things on the table, then got down to business in a hurry.

"All right, fellows," he began. "Tonight I want to help you brush up on what is probably the most important thing in the world to all of us. You and me and thousands of others depend on it for a living; in fact this thing we call 'the modern age' wouldn't be here without it; no telephones, no telegraph or radio, no electric lights, no movies, and what's right up our alley, no automobiles. This thing I'm talking about is magnetism.

"There's two kinds of magnetism," Sam continued, "or perhaps I should say that we can get magnetism from two different sources. We've had the permanent magnet in the form of the mariner's compass for thousands of years, but

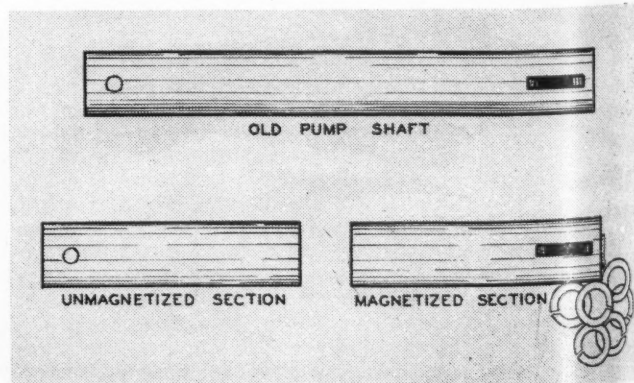
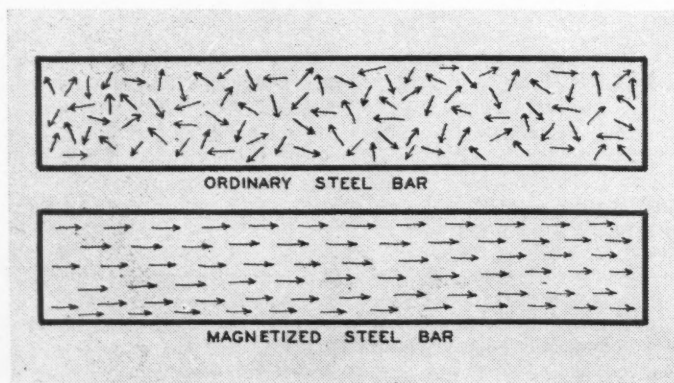


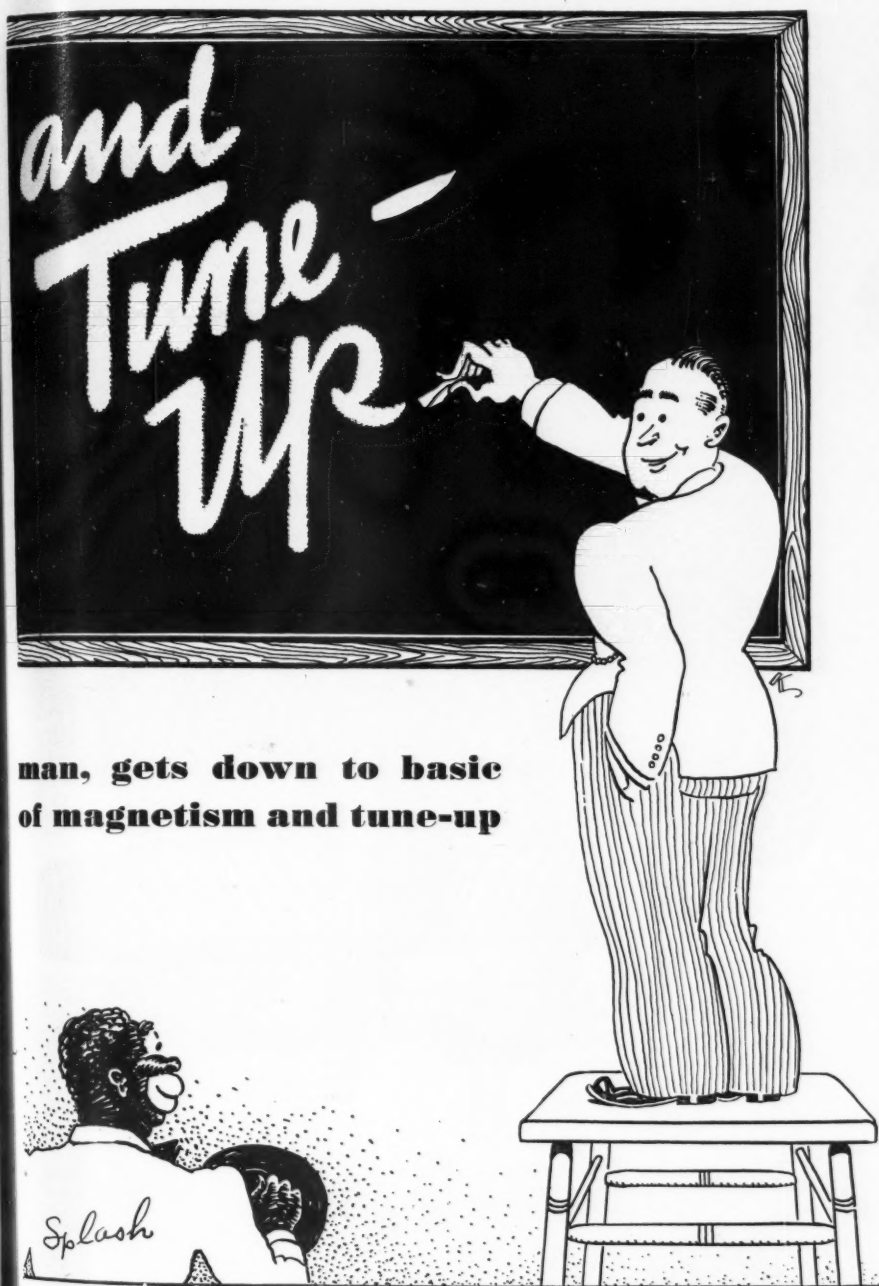
Sam Miller, the practical service station fundamentals on the study and application



Fig. 1. Explaining the molecular theory of magnetism (below). In ordinary steel the molecules point in all directions, while in the magnet the molecules are arranged in a common direction. Fig. 2 (right, below). A simple experiment in magnetism. Here an old pump shaft having no magnetic characteristics is sawed in half. One end is placed in a magnet

charger for an instant and becomes a magnet, while the other end is still non magnetic. Yet both are the same kind of steel. Regular magnets are made of special steels that retain their magnetic properties for long periods. In the magnetized piece of the pump shaft, the steel molecules point in the same direction.





man, gets down to basic
of magnetism and tune-up

aside from telling direction we never got any good out of the invention until we learned how to use electricity. It takes electricity to make permanent magnets that are large enough and powerful enough to be of much service. Without permanent magnets Bell and Marconi and Edison wouldn't have got to first base.

"Now some of you may be wanting to ask, 'What makes a magnet a magnet?' I'll be honest with you; I don't know. All I do know is that even the scientists can't agree about it. There's two main theories that are circulating around now. The theory of magnetism that seems to have the most converts is called molecular attraction. Science tells us that all substances are made up of tiny particles called molecules. You can't see 'em with a microscope but they're supposed to be there. In a piece of iron or steel these little individual molecules are supposed to have a north and a south end like a compass needle. In an ordinary piece of steel these molecules are pointed every which way, and there isn't a damn bit of teamwork in the lot—no magnetism.

"They tell us that when you take a piece of steel and shoot strong magnetism through it, it causes these molecules to turn around and all point the same way. It's a kind of In Union There Is Strength proposition, and the result is that you have a magnet that will hold magnetism over a long period of time. I'll sketch these molecules on the blackboard so you can get what I mean. (See Fig. 1.)

(Continued on page 120)

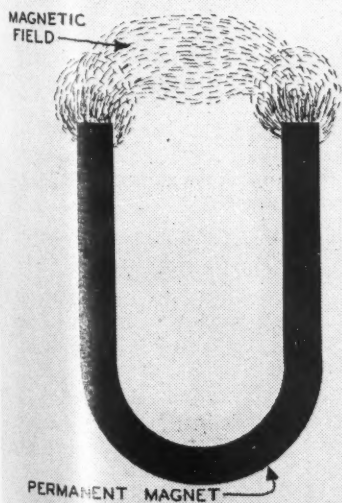
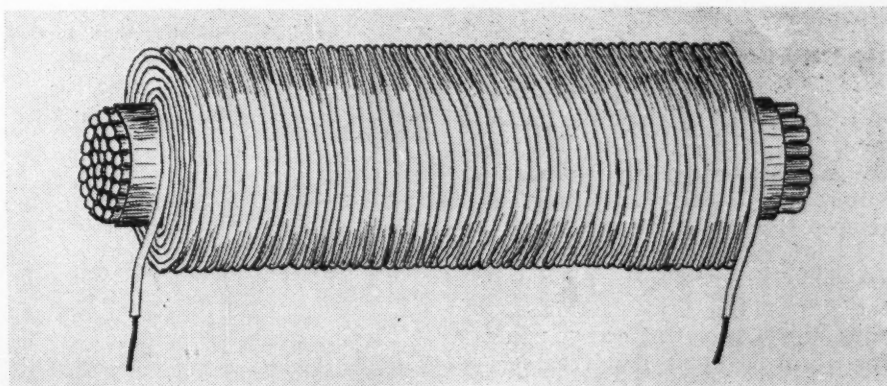


Fig. 3 (left). A permanent magnet gives off a constant flux, or magnetic lines of force. The field of a U-shaped magnet is as shown above. This field, while not visible, can readily be detected with a pocket compass. Fig. 4 (below). An electro-magnet consists of an iron or steel core surrounded by a coil of wire. The unit becomes a magnet when current flows through the coil. The most efficient types of electro-magnets have a core made of a bundle of iron wires.





FLAT RATING

On Chevrolet Trucks

TO remove the third member assembly on Chevrolet trucks with two-speed rear axles, remove the two nuts holding the front propeller shaft assembly to the cross member and drop the unit. Remove the cap screws holding the ball collar to the housing and slide the ball back on the rear axle propeller shaft housing. Remove the trunnion bearing lock rings and drive the trunnion bearings from place. Split the universal joint and let the rear axle propeller shaft drop down.

Remove the rear yoke from the end of the rear axle propeller shaft and the ball and collar from the propeller shaft housing. Remove the nuts and lockwashers which retain the axle shaft flange to the wheel hub.

On the 2-speed rear axle the axle shaft flange cap screws have been replaced by studs screwed into the hub. Axle shaft stud lock sleeves have been added to assure a positive drive and prevent loosening.

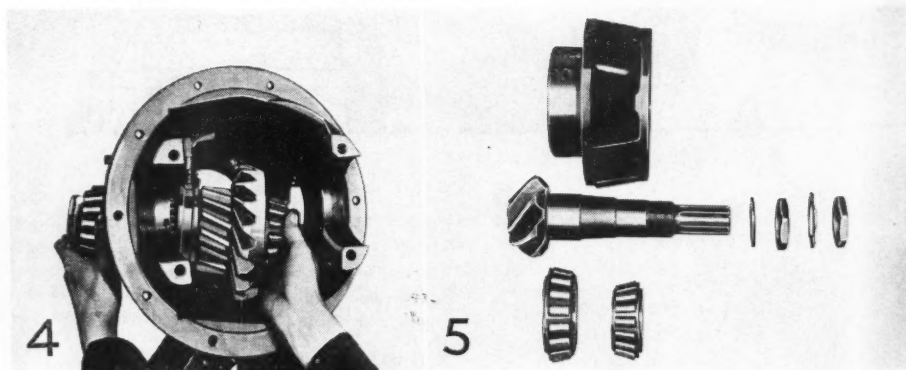
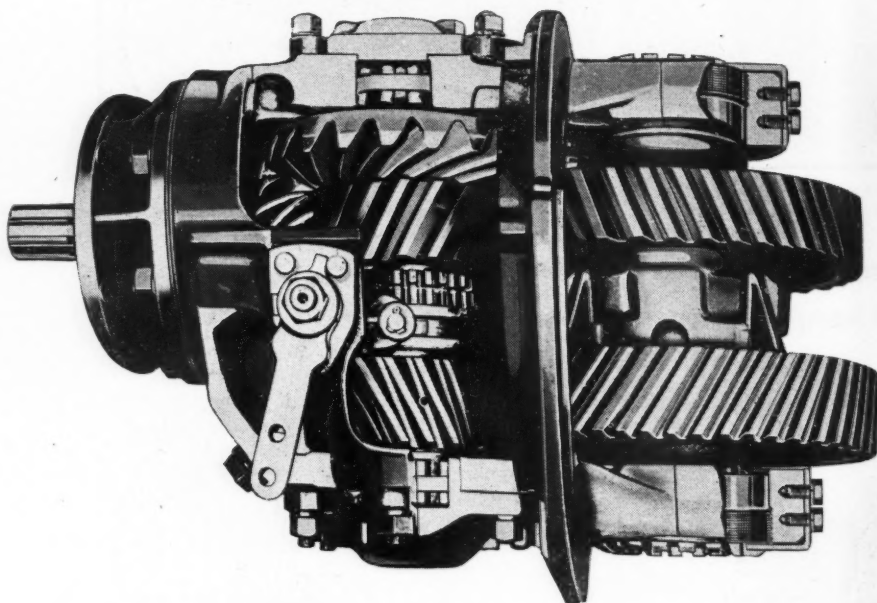
Install two 7/16-in. by 14-in. cap screws in the holes provided in the shaft flange and by turning the cap screws alternately, the axle shafts can be removed from the wheel hub. (Fig. 2)

Remove the cap screws which fasten the third member carrier to the banjo housing and place a jack under the carrier. The third member assembly can now be removed from under the truck.

Third Member Disassembly

Place the third member assembly in a bench vice by clamping on the lower rib of the carrier. Remove the cap screws which retain the torque tube to the pinion cage and remove the torque tube.

Before removing the differential assembly from the carrier, mark the differential bearing caps and adjusting nuts with a center punch for identification when reassem-

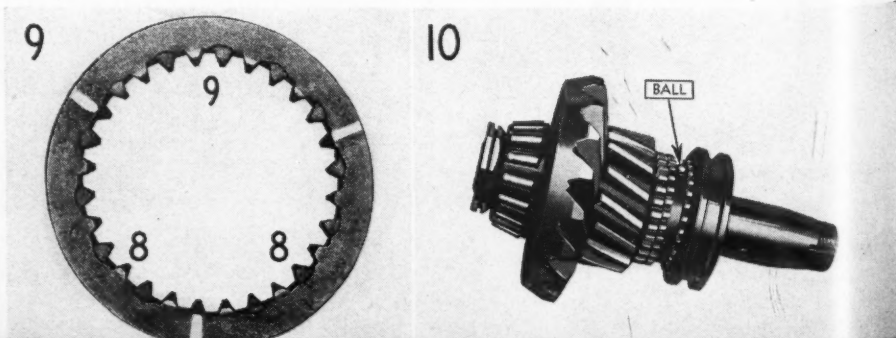


4. Slide the double reduction shaft to the left and draw the ring gear out the rear.

5. Showing the layout of the parts making up the pinion cage assembly.

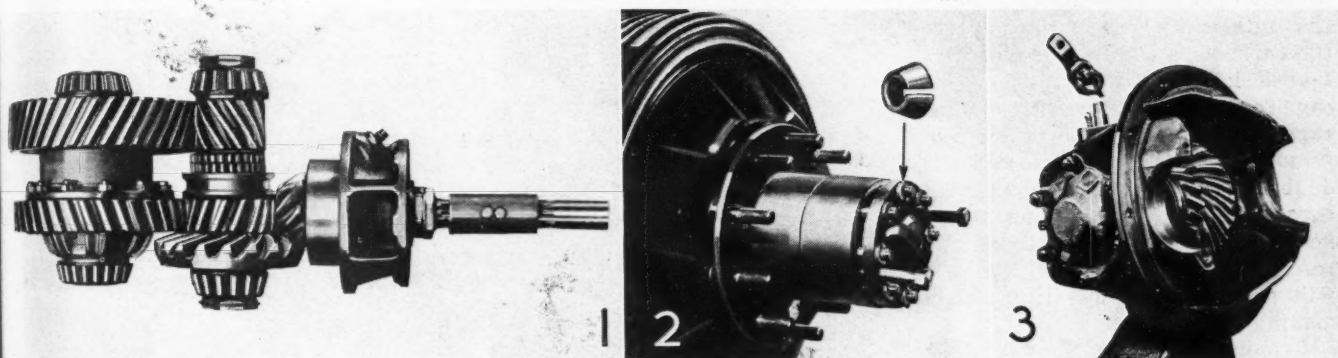
9. The 9-tooth spacings on the shifter sleeve must line up with the teeth between the holes in the shaft.

10. Install the springs and balls in the holes in the shaft. Install sleeve with tapered side towards pinion.



TWO SPEED Rear Axles

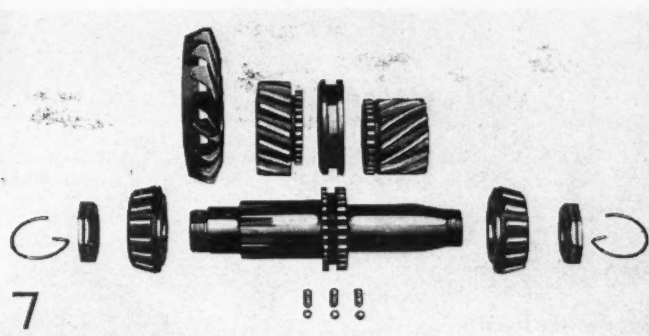
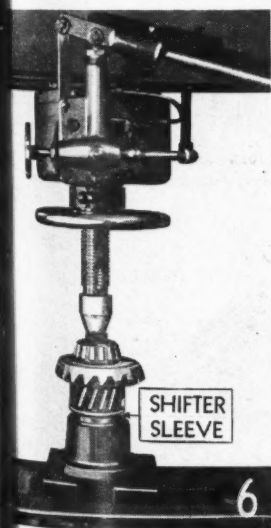
It's easy, and here's the low down



1. Showing the arrangement of the rear axle gears out of the case.

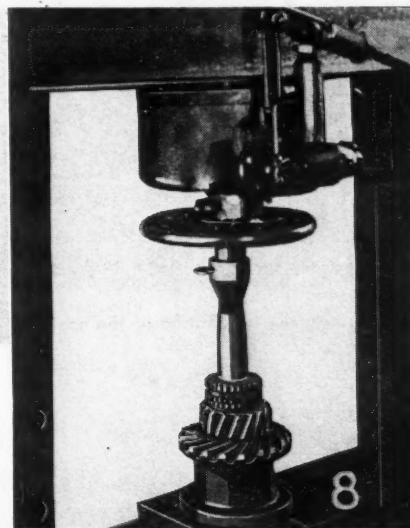
2. Axle shaft stud lock sleeves prevent studs loosening. Remove shaft from hub with two 7/16 in. cap screws.

3. Remove the shifter lever retainer nut and lock washer, and remove the lever, pawl and Woodruff key.



7. Showing the layout of the parts making up the double reduction shaft assembly.

6. Press the bearing and ring gear from the shaft with the shifter sleeve in place on the shaft.

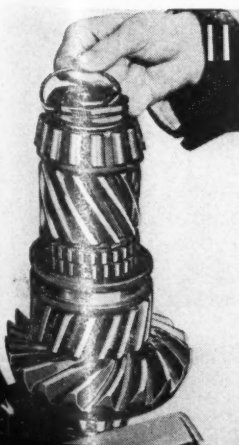


8. Install the high-speed double reduction pinion on the shaft, press the ring gear on the shaft.

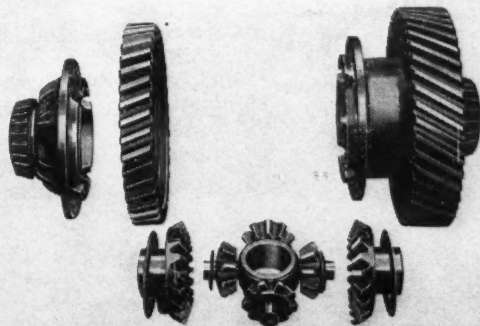
11. Lock the nuts by installing the lock rings when clearance between pinion and bearing race is .012 to .015 in.

12. Showing the layout of the parts making up the differential assembly.

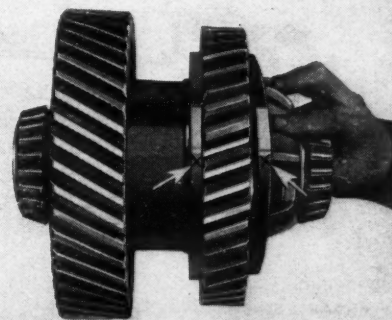
13. Install the cover, making sure to mate the "X" marks on the case and cover.



12



13



FLAT RATING TWO SPEED

Rear Axles

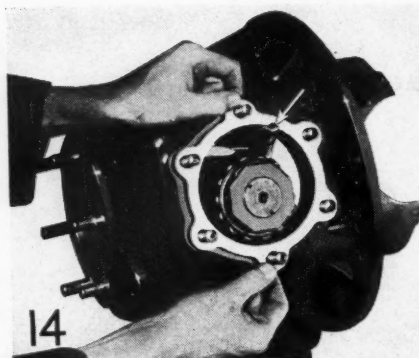
bling. This is important because the caps are machined in place.

Remove the tie wire, differential bearing adjusting nut locks and the bolts from the bearing caps. Remove the bearing caps and differential assembly from the carrier.

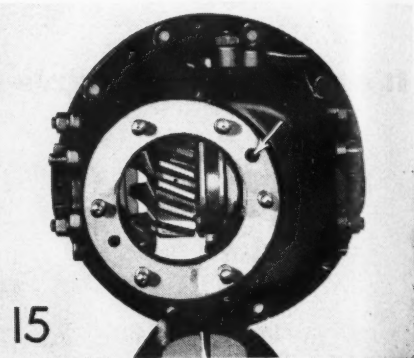
To remove the pinion cage and propeller shaft assembly, remove the nuts which retain the cage to the carrier. NOTE—there are two tapped holes in the flange of the cage for use when removing a tight cage. It is most important when removing the pinion cage and the double reduction shaft bearing caps that the number and thickness of the shims be checked for reference when reassembling. This will save considerable time when making adjustments.

Remove the shifter lever retainer nut and lock-washer. Then remove the lever, pawl and Woodruff key from the shifter yoke shaft. (Fig. 3) The bushing can be removed by raising it with a screwdriver through the notch provided in the carrier. NOTE—The bushing must be removed at this time to facilitate the removal of the double reduction shaft assembly.

Remove the nuts and lockwashers
(Continued on page 95)



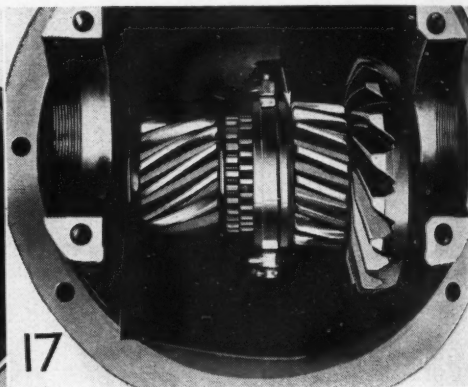
14. Line up the cut-outs in the gasket and shims with the lubrication openings.



15. Line up the oil holes when assembling the pinion cage to the third member.



16. Check the backlash with a dial indicator. Correct setting is from .006 to .012 in. backlash.

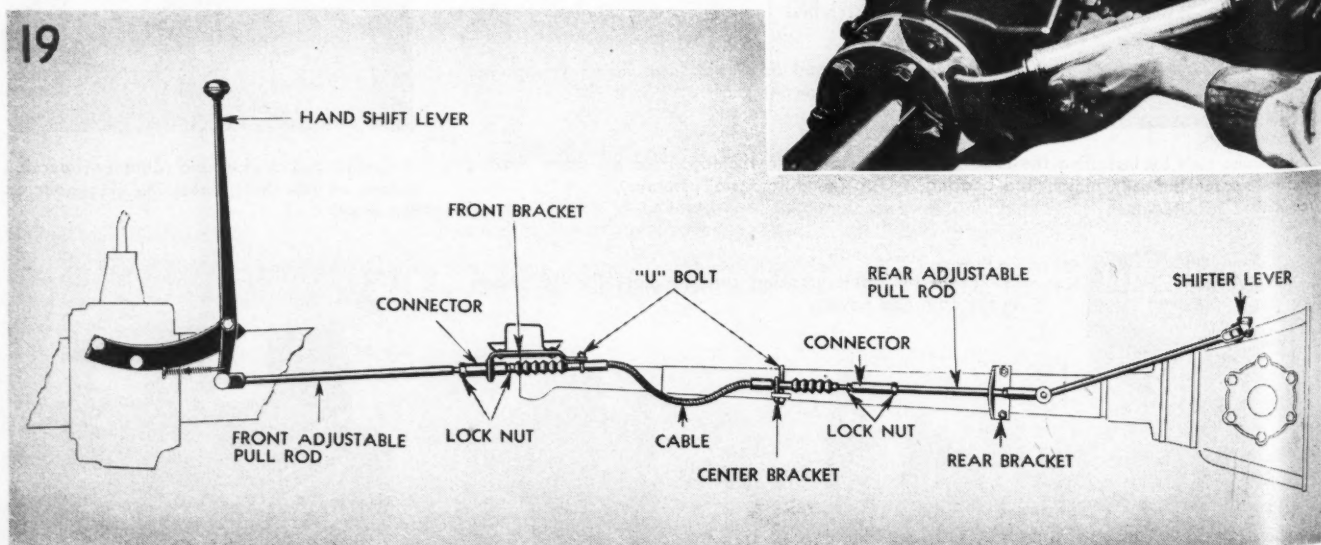
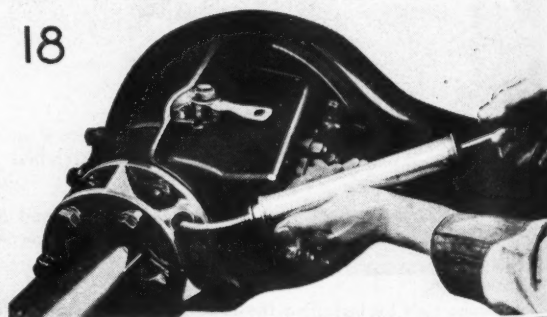


17. Check the clearance between the shifter sleeve and the high-speed pinion: .015 to .025 in.

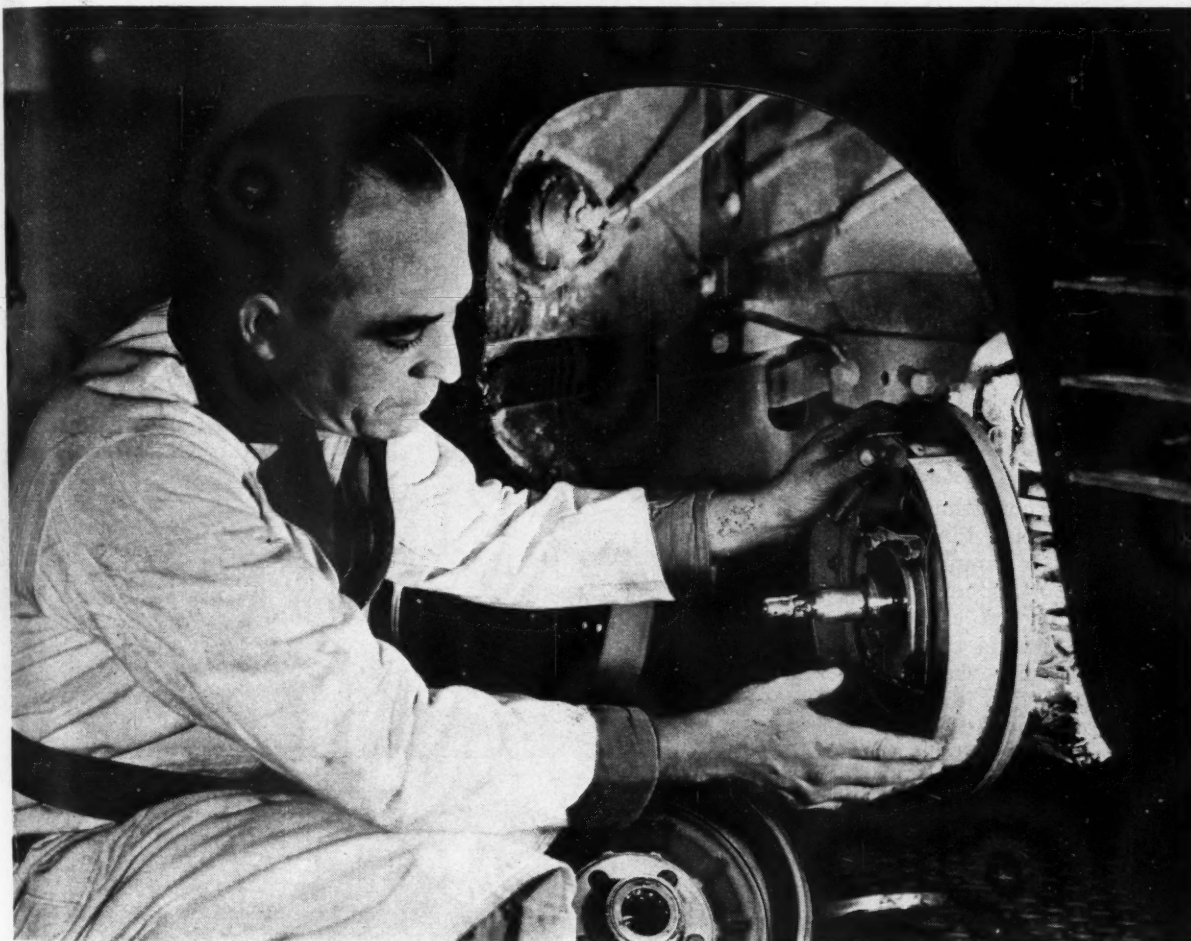
18. Inject one pint of lubricant in the space between the bearings.

19. Showing the installation of the control linkage on the truck.

18



GETTING MORE **Brake** JOBS



EVERY car that hits the grease rack at the Jones garage in Washington, D. C., has two things done to it. First the front wheels are pulled at no charge to the customer, and secondly, each muffler is closely scrutinized and examined.

The wheels are pulled for the primary purpose of examining the brake lining and securing brake jobs. The muffler is examined because it is dangerous to drive with a blown muffler and at the same time the garage can sell a new muffler.

Thus 80 per cent of their brake work is picked up in that way, and from two to five mufflers are sold a week.

The reason is obvious. The hy-

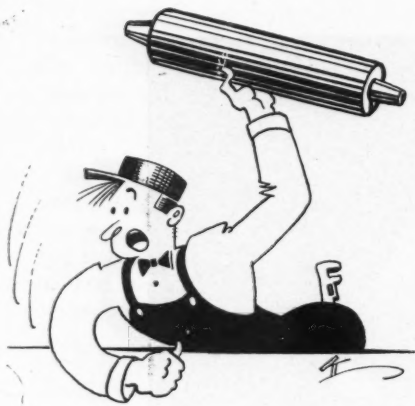
**Preventive maintenance means
more money in the till and more
satisfied customers**

By FRED E. KUNKEL

draulic brakes use up all the lining and finally run down to the brake shoe and still the person driving that car has braking power but doesn't know the danger he is running into. Thus through inspection

they catch it before it scores the drums, which saves the customer the price of replacing the drum or regrounding. A thing he is eternally grateful for and which instills confidence that Jones is the place to

-AND MORE Mufflers, TOO



take his car for anything and everything.

Thus by examining the condition of the brake lining and seeing that the brake lining has been ground right down to the rivets and cut the drum, they can call the car owner's attention to it and get the job. At the same time when they have the front wheel off they can repack them if necessary, another thing which is frequently neglected by the average car owner and seldom looked at by the average garage mechanic.

So also while the car is on the rack they check up things in general, such as his steering gear to see that nothing is loose. By doing all these things for car owners, even though they only drove their car in to be lubricated, and by doing it without charge, the car owner appreciates that kind of service and if they find anything wrong they know it before the car owner finds it out with trouble on the road and he appreciates that even more, because the owner would not know unless he got underneath his car to take a look.

Thus by practicing *preventive maintenance* they not only save the car owner future worries but also make jobs for themselves. For example, every car that comes on the grease rack is also checked as to the condition of the exhaust pipe, checking the condition of the muffler and tail pipe, to see whether new equipment is needed. They tap the muffler to see if there is any loose rust or a leak of any kind



that might cause trouble or be dangerous. If they find anything wrong with the muffler they tell the customer about it, and put the car back on the rack to show him.

At the same time while they are talking mufflers they have a complete display rack of different kinds of makes right in front of the car owner at the grease rack. This display includes the most popular makes of cars on the market. Thus the Jones Garage sells anywhere from two to five mufflers every week, which means a good sized annual volume.

The brake testing machine is by the front office when a man drives into the garage. Each customer driving in applies his brakes and the brake scales tell the story. The service manager or some mechanic is always watching that. Their eyes automatically clip to that machine because that is good business.

"Your brakes are very much out

of line," the attendant will say. If the car owner does not think so or asks why, they tell him to back up and hit the brake testing machine again, showing him where his brakes are right or wrong. Thus the machine automatically condemns his brakes and provides a brake job. This brake machine is the same as is used by the Government authorities to check brakes, for inspecting cars and issuing driving permits for the vehicles.

Another feature of this garage, which has all the latest equipment on the market throughout, is that all their service work is done on the first floor. It is a complete safety lane or inspection check up service all by itself. And practically all equipment is in white porcelain, from the latest type of two post hydraulic lift to the very latest cabinet work bench, with all kinds of carburetor parts from one end

(Continued on page 104)



"Is there a good mechanic in town?"



By EDWARD L. WARNER, JR.

ADOPPING a sound policy of growing with the neighborhood, the Marcellus family has established a thriving super-service station on one of the main thoroughfares of northwest Detroit within the short space of three years. Hilton and Elmer Marcellus, with the experienced counsel of their father, James M. Marcellus, who has spent 15 years in the service station field, opened their new station in May, 1938. It is located on Schoolcraft Ave., in a rapidly expanding middle class residential district.

The servicemen were not without forethought in locating their station where they did. They cruised the streets of Detroit's west side for many days before deciding

Super Service

Here's how the super service method helped a Detroit independent service station feed

Men at work in the busy Marcellus super service station. Our camera man captured a handful of action shots which show the super service method in operation. Top of

page (circle) shows the serviceman using a gear case and engine flusher in the lubrication department. Across the pages is a general view of the Marcellus service building.



Service crew. Front row, Elmer (left) and Hilton Marcellus. Their father, James M. Marcellus, stands between them in the back

on a site. Previously, they had leased a station for more than two years in a sparsely settled outlying section of the city, where most of the business was transient. But they saw an opportunity to build up a more stable neighborhood superservice on a foundation of good will and customer satisfaction.

So they scraped together \$7,000 capital, borrowed some additional

funds and launched their new venture. They had some misgivings at first when they pumped only 1197 gallons of gasoline in the first 11 days. But their pessimism was short-lived. In the intervening months their business has steadily grown until they now pump 25,000 gallons per month, reaching 1200 gallons per day on week-ends.

But gasoline is only a small part



IN DETROIT

establish constant car owner contacts for
ing all departments from the gasoline pump

showing an attractive front, easily-accessible service entrances, well-located gasoline islands, a rugged tow and service truck, display material well used. Down the column on the

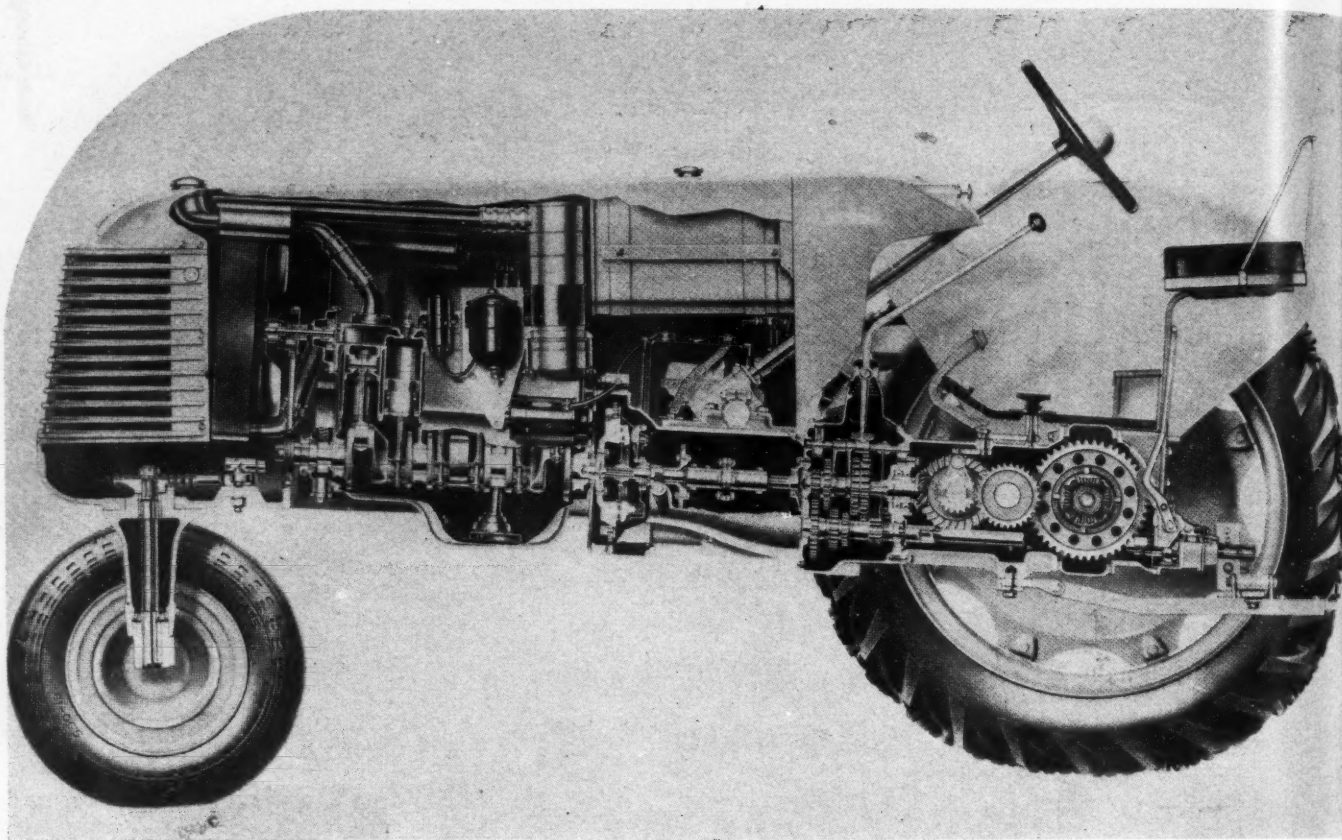
right page there are 1. a general view of the lubrication department, with three racks and two lifts; 2. Testing and tune-up with an engine analyzer; 3. Tire repairing equipment.

of their total business, which is well diversified with lubrication, tires, batteries, accessories and a small repair shop. They now have a total investment of \$27,000 on which they do an annual gross business of \$85,000. They have more than kept pace with the neighborhood, which has doubled in population during the period due to heavy residential construction.

Neighborhood goodwill is the keynote of their success. Both Marcellus brothers and their father reside nearby and they have made the Marcellus Service an integral part of the community. They call for and deliver customers' cars, which appeals particularly to the women drivers who appreciate such time-saving. They maintain AAA road

(Continued on page 124)





SPLITTING THE GRAHAM.

SHOULD it become necessary to overhaul the transmission and differential assemblies, it is best to remove these units as an assembly and place them on the bench.

The tractor should be placed under a double chain fall, the front chain fall brackets being bolted to the side rails of the tractor as shown at the top of the opposite page. Take up the chain slack.

Remove the cover for the rear power take off, mounted on the axle housing, and drain the oil.

Remove the through shaft if the tractor is equipped with rear power take off.

Disconnect the clutch control rods at the bell crank, and remove clevis from rod that runs forward.

Disconnect light wires at junction block under floor platform, and remove the junction block.

Remove seat assembly at axle housing cover.

Take out the cotter pin and remove the handle for axle declutch lever.

Unhook three hold-back springs for pedals, at the floor platform, and remove the platform assembly.

Disconnect right and left hand brake shafts by removing the nut and bolt on the serrated collar, and slipping collar back on the shaft.

Slip the brake shaft assembly out of the bearing in the carrier housing, and remove as an assembly.

Remove eight nuts from axle shaft flange on rear wheels.

Pull rear axle shafts, using Spanner puller screwed into tapped holes provided in axle flanges.

Remove four capscrews holding bottom of cowl (right and left) to transmission.

Remove eight nuts and lockwashers holding right and left hand side rails of tractor to transmission case.

Remove flat hand hole cover from underside of flywheel housing.

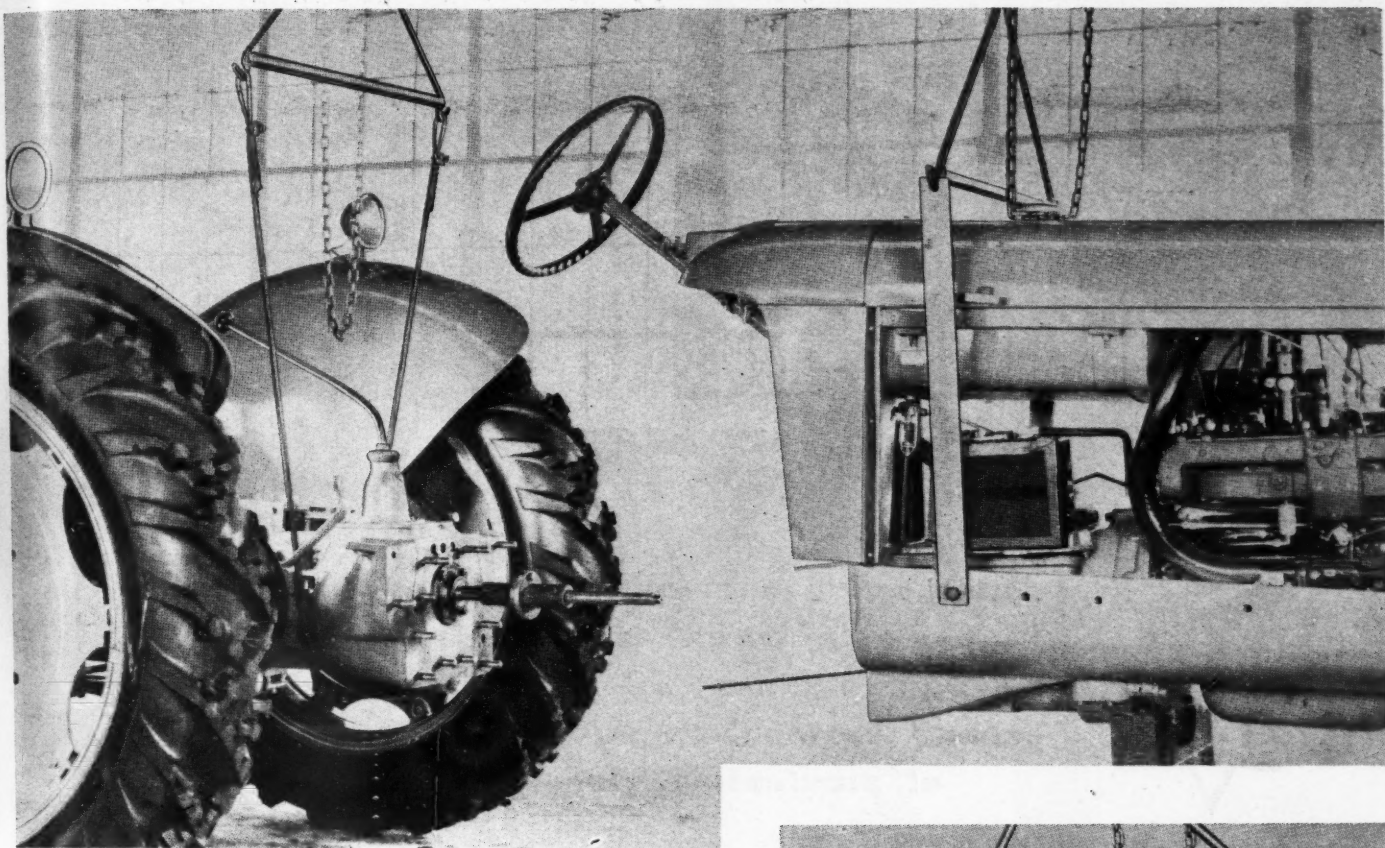
Through this opening remove six nuts and lockwashers holding flywheel housing to transmission case. (Note: on Model 503.103 do not split coupling as this will pull out.)

Block up rear of engine as shown to keep motor in position when tractor is split.

Place the cable suspended from the second chain fall hanger in position around the transmission as shown, to support rear half of tractor. Take slack out of cable.

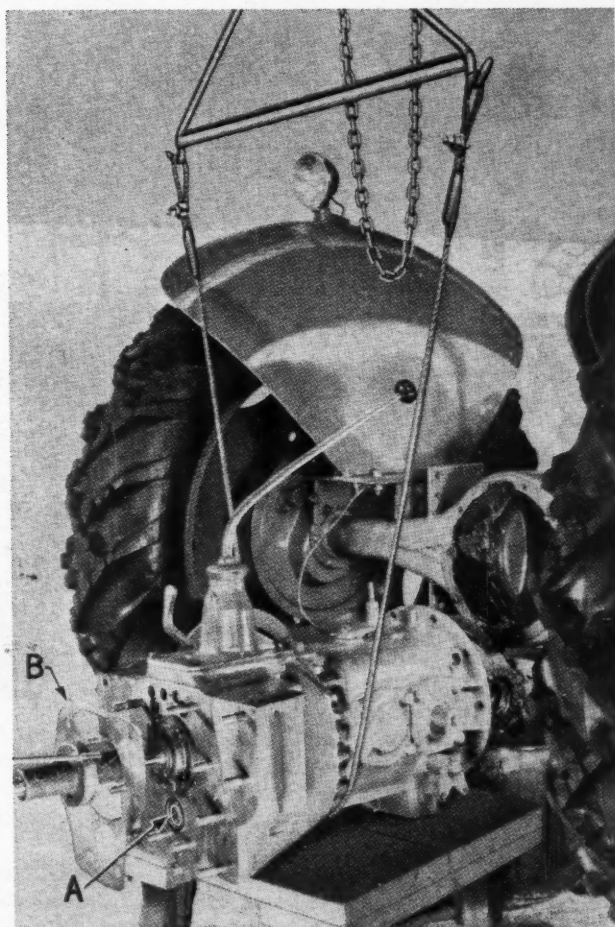
Rock the rear half of the tractor back and forth on its rear wheels until the tractor separates. Then

(Continued on page 67)



M- **BRADLEY** Tractor

In order to overhaul the transmission or differential of this tractor, the job has to be split apart at the flywheel housing. Here are detailed instructions covering this operation



Left page—A sectional view of the Graham-Bradley tractor, showing its construction. Top of page—Showing the method of suspending the two halves of the tractor as it is split, to keep it from falling and to simplify the operation of separating and re-joining the halves. Above—Transmission and differential removed from the rear housing and lowered to a bench, preparatory to overhauling.

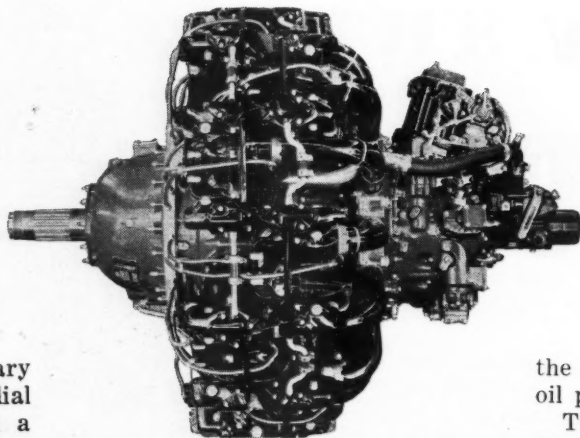
WASP RADIAL



Engine Service

Automotive mechanics who are looking forward to servicing aircraft engines will find this second National Defense article of particular interest

By Bob Hankinson



Twin-row radial, 14-cylinder, 1200 h.p. Pratt & Whitney Wasp engine for airplane service

WHEN it becomes necessary to disassemble the radial engine, it should be placed on a tilting stand and securely fastened in place. The tilting stand makes it possible to turn the engine over so as to reach all parts easily.

The accessory units should be removed first to clear the way for the actual motor work and to prevent the possibility of damage to the units.

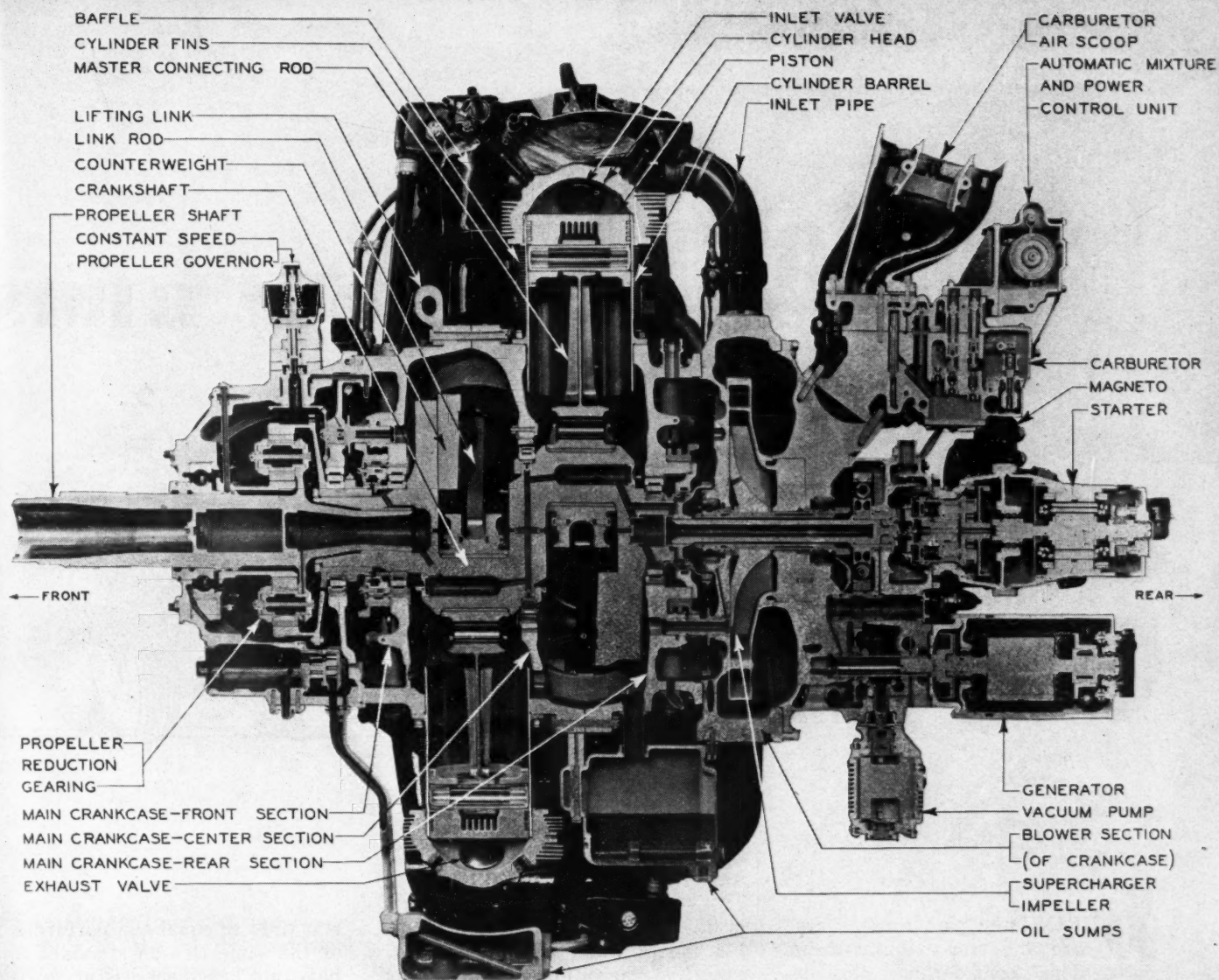
While the procedure for disassembling all radial engines follows the same general sequence, the following outline applies specifically to the Pratt & Whitney Wasp 9-cylinder radial.

Remove the wire terminals from the spark plugs and remove the spark plugs. Remove the distributor blocks from both magnetos. Disconnect the magneto advance link assembly and remove the magnetos. Remove the carburetor air scoop and the carburetor. Remove the mixture heater, the generator and

the starter. Remove the fuel and oil pumps.

Turn the engine over so that the front is accessible, and remove the cylinder hats from the rocker arm housings. Remove the push rod enclosures. Remove the intake pipe flanges and loosen the packing nut at the base of the intake pipes. Take off the oil sump which is between the two bottom cylinders.

The next step is to remove the cylinders from the crankcase. Start with the cylinder to the left of No. 1, and bring the piston up to top center of each cylinder before the cylinder is removed. This is to prevent the possibility of damage



Sectional view of the twin-row radial Wasp airplane engine

to the scraper ring. No. 1 cylinder should be the last one removed. Loosen the bolts holding the cylinder to the crankcase, and carefully slide the cylinder off the piston. Tag the valve push rods, because they must be reinstalled in the same positions from which they were removed.

As each cylinder is removed, push out the piston pin and remove the piston from the link rod. If the same pistons are to be reinstalled they should be marked with the cylinder number from which they were removed so that they will be put back in the correct cylinder.

After all cylinders have been re-

moved, remove the nuts which fasten the front section to the main section of the crankcase. Remove the thrust bearing cover and nut. It will then be possible to remove the nose section together with the thrust bearing. After the nose section has been removed, slide off the timing sleeve and take out the crankshaft key. Examine the shaft for burrs and remove them before sliding the timing cam off the shaft. With the cam removed, the oil distributor bracket may be removed.

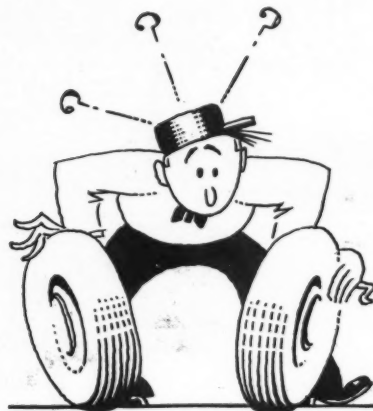
The main crankcase is made in two sections, bolted together. Remove the nuts from the bolts, and tap the bolts back as far as they will go. The forward section of the main crankcase can then be pulled off the front of the shaft. The next step is to remove the crankshaft and connecting rod assembly as a unit.

Turn the engine on the stand so that the rear is on top, and remove the generator drive, starter jaw and the generator drive gear. Pulling off the coupling and removing the key in the pump drive gear will permit removing the magneto and starter drive shafts through the front of the case. Remove the rear oil drain pipe assembly. Remove the blower section from the rear section of the main crankcase, after loosening the nuts holding the two sections together. Tap the rear section with a fiber hammer to help separate these two sections, and pry them apart with a blunt instrument—not a screw driver. Be careful not to damage oil lines, surfaces or bushings.

The master connecting rod is a one-piece rod, so to remove it from the crankshaft it is necessary to
(Continued on page 67)

WIDE OR NARROW RIMS

Will the automobile of the next few years ride on standard size tires mounted on wider rims? Read this digest of reports covering development work performed by two of the major tire manufacturers



DURING the past three years, tire and rim manufacturers have done considerable development work along the lines of improving car handling and increasing tire life by increasing the width of the rim on which the tire is mounted. This work has consisted of a wide range of experiments with different width rims and different tire construction to determine whether, by these methods, greater stability can be built into the automobile and at the same time increase the useful life of the tire.

Reports of the progress that has been made along these lines were contained in papers presented at the Annual Meeting of the Society of Automotive Engineers at Detroit early in January. One of these papers was presented by Dr. Sidney M. Cadwell of the U. S. Rubber Company, and another by R. D. Evans of the Goodyear Tire & Rubber Company.

Dr. Cadwell reports—"The low pressure tires used today at inflations of from 25 to 30 pounds per square inch are used on rims having a width between the vertical rolled flanges of from 60 to 68 per cent of the inflated tire width. . . . The wide base rim proposal considers substantially the use of ex-

isting size tires on rims from 1 to 1½ inches wider than at present, giving a rim ratio of 75 to 82 per cent of the tire width. . . . The principle benefits of this rim resizing combination, using present tire load carrying capacity and 2 pounds lower inflation pressure, are: (1) Considerably more stability in the car, and (2) a 20 to 22 per cent increase in tire tread life."

Under the disadvantages listed by Dr. Cadwell as resulting from increasing the rim width, the chief one seems to be that of riding qualities. His report states, "Softness of ride may be defined as the ability of the tire to absorb those road shocks which are of sufficient magnitude to cause the whole tire, both tread and sidewall, to deflect a major amount. Soft ride, a feature of modern cars, has been lost to a great extent when tires are used on wide base rims. The inability of the tire to absorb major road shocks as efficiently as the tire on the standard rim is inherent, because the straighter sidewalls, acting as flexible supporting struts for the tread, require more effort to deflect vertically when major road surface variations are to be absorbed, thus making the ride harder but the stability better. Efforts to improve ride of wide base

rim tires to equal the performance of the same tire on standard rims have not been successful to date. Tire ride softness alone may be controlled to an extent by use of tread patterns having open, flexible tread units in combination with narrow lightweight treads. Designs of this type, however, are invariably poor for tread wear life and stability, and would therefore cancel the principal benefits of wide base tire usage."

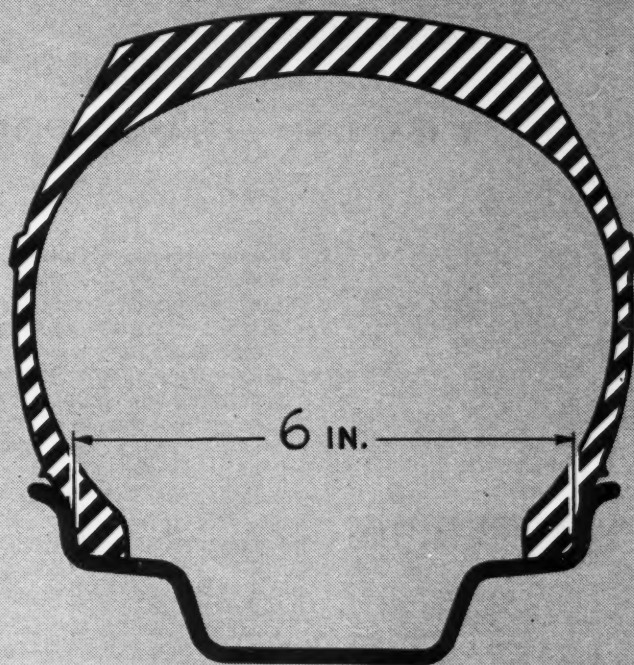
In the paper presented by R. D. Evans it is pointed out, "An increase from a 65 per cent to an 80 per cent rim corresponds to approximately 3 lbs. increase of inflation pressure, varying somewhat with the particular design of tire involved. As for the car itself, our tests indicate that it is necessary to decrease inflation from 2 to 4 pounds to get an equivalent ride with the 80 per cent as with the 65 per cent rim. This differential varies with different cars. Some observers have reported as much as 6 pounds. It is clear that this pressure differential, believed to be necessary from considerations of ride, partially offsets the treadwear and stability advantages of wider rims. Indeed, the 6 lb. differential indicated to be necessary by some engineers would entirely wipe out

FOR FUTURE Tires?

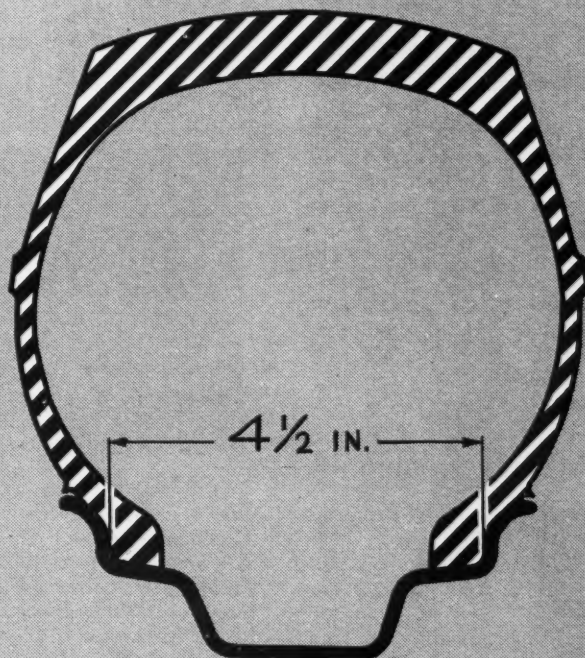


the stability advantage, and would largely offset the treadwear advantage previously described."

However, Dr. Cadwell sums up his report with the statement, "Car and tire design engineers appreciate that the tire for modern motor vehicles is a complex mechanical and chemical elastic system enclosing the supporting air cushions on which the car rides. In readjusting this complex structure for those inferior properties just mentioned, it has been determined they can be brought to the equal of present tires on existing rims by the tire manufacturer assuming the responsibility for tire harshness, and the tire tread shoulder cracking. Car engineers have in general indicated that future new cars can be brought to the equal of present performance for ride, pavement seam bump and parking effort by changes in the car steering, suspension and shock absorber system. The problem of greater rim curbing with a sharp increase in number of rim edges with paint rubbed off and battered, rasp worn appearance may bring unfavorable customer reaction. Drivers in the future must exercise more care in parking and they will be forced to cultivate the parking habits of owners of white sidewall tires."



Standard size tire mounted
on a 6 inch rim



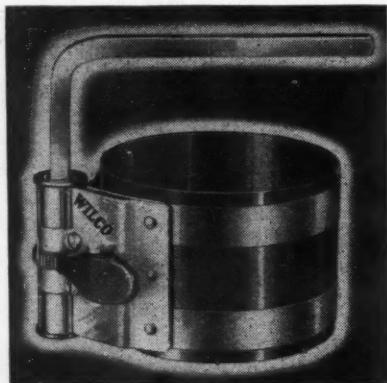
Standard size tire mounted
on a 4.50 inch rim

NEW profit makers

PARTS TOOLS EQUIPMENT ACCESSORIES

Wilco Ring Compressor

Features of the new Wilco master-universal piston ring compressor, announced by Wilkening Mfg. Co., Philadelphia, Pa., are the positive ratchet lock which holds the bands tight and the use of two tension bands of special steel, one at the top and one at the bottom. The ratchet lock elim-



inates any slippage of the compressor bands while the piston and ring assembly are being pushed into the cylinder. The two tension bands keep all the rings under full compression until they are in the cylinder. The compressor is made in two sizes: model MU-5 with range from 2½ in. to 5 in., list price \$1.90; and model MU-7 with range from 3½ in. to 7 in., lists at \$2.50.

Formax Rubbing Compound



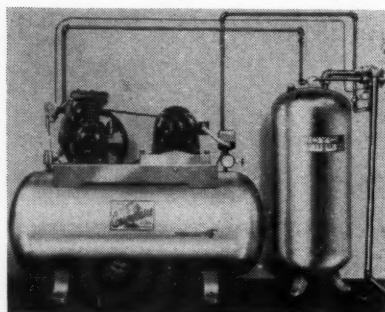
it cleans, rubs down, polishes and waxes, and can be used on the finest enamel and lacquer finishes without

The Formax Mfg. Co., 3999 18th Street, Detroit, Mich., has developed an all-purpose rubbing compound which is claimed to combine four distinct operations in one:

danger of scratching. The manufacturer states that it works equally well for spot refinishing where feather-edging is required, or for bringing road and weather-beaten finishes back to a brilliant new-car luster. A sample of 4-Max hand rubbing compound will be sent upon request.

Conservitaire Power Units

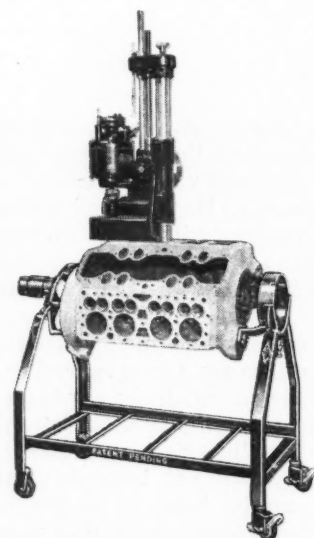
A complete new line of Joyce Conservitaire Air Power Units, made by The Joyce-Cridland Co., Dayton, Ohio, has been placed on the market. The Conservitaire unit, designed for economy in hydraulic lift operation, furnishes all the usual compressed air requirements for the numerous air powered appliances used in the service station. The outstanding feature of the Conservitaire unit is that the air which is ordinarily expelled while the lift is being lowered, is passed from the oil tank back to the



live air tank, greatly reducing the length of time the compressor unit has to operate, and resulting in a saving which the manufacturer states is from 50 to 60 per cent in power cost. Illustration is of the Model JH11-T16, two-stage, two-cylinder Junior Conservitaire with 60 gal. air tank and 30 gal. air-oil tank. The complete line includes both horizontal and vertical models, single and two stage compressors, with motors rated at ¾, 1 and 1½ hp.

Engine Rebuilding Stand

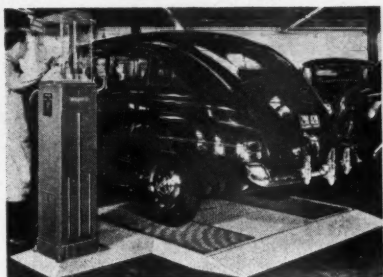
N. F. Clayborne, 2640 S. Michigan Avenue, Chicago, Ill., has announced an engine stand for mounting Ford V-8 engines while reconditioning them. The stand is equipped with a locking index device which holds the block in proper position for cylinder boring. Two straight and two swivel casters with brake mechanism permit



moving the engine at will, and yet when the brakes are applied, hold the stand in position for reconditioning work. Special fittings are available to adapt this stand to Dodge and Plymouth engines also. Price complete with fittings for Ford V-8 "60," "85" and "95," \$32. Dodge and Plymouth fittings, \$11.50.

Wheel Aliner and Brake Tester

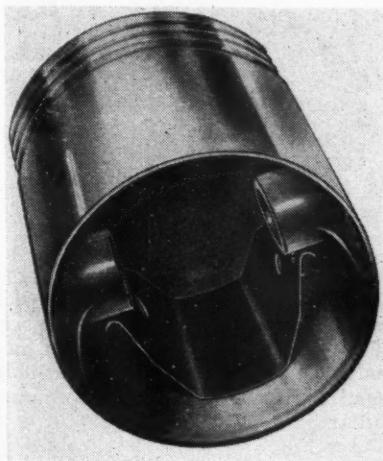
One of the latest products to be introduced by Weaver Mfg. Co., Springfield, Ill., is a new two-plate brake tester and wheel alinement indicator. Designed for the shop where space is limited, the new tester uses only one set of plates to indicate both alinement and braking efficiency. Driv-



ing over the plates slowly registers wheel alinement, while driving on and applying the brakes indicates braking effort. Indicators are set to record the readings for the front wheels so that the braking efficiency of the rear wheels may be compared. The tester is supplied either with the short ramp for surface mounting, as illustrated, or in a flush-type mounting in which the plates are sunk to the level of the floor.

Thexton Expander For Solid Skirt Pistons

Recently placed on the market is a new solid skirt piston expander engineered by the Thexton Mfg. Co., 313 3rd Avenue, Minneapolis, Minn. This new expander is designed to restore the thrust diameter of solid skirt pistons so as to stop piston slap, reduce



oil pumping and save piston rings. It is easily installed with special pliers furnished by the manufacturer, the wide rounded lips resting against the piston pin bosses.

Aids Engine Lubrication

Magnus Met-Affin, a new product recently announced by the Magnus Chemical Co., Inc., Garwood, N. J., is said to act as an oil anti-freeze when added to the crankcase.

The manufacturer claims it protects the motor during the warming up period when motor wear is greatest by aiding the oil in quickly reaching

and coating all moving parts. Magnus Met-Affin is claimed to prevent the formation of sludge and engine varnish and to keep valves and rings free.

A counter display card and a streamer banner are available as merchandising aids.

Champion Tire Groover

Improvements have been announced in the Champion electric tire groover made by O. E. Thompson & Sons, Ypsilanti, Mich. The all-purpose head now has a new patented Clear-Vision Guide Point which shows exactly where the cut is to be made, and will take all blades from the very



narrow 1/16 in. for use on the newest style tires to the wide 1/2 in. blade for truck, tractor and bus tires. Any desired depth cut can be made without removing the blade from the head. A new long-life cartridge type replaceable heating element of various wattages is used, assuring quick, constant heat. Six models are now available; two straight handle push type, three pistol grip push type and the new pull type. Prices range from \$8 to \$19.50.

Whiz Clean Flush Offered

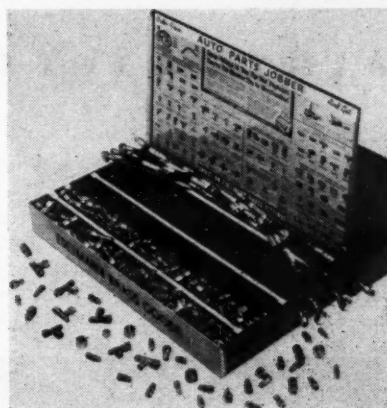


rust, dirt, grease and scale. It is safe to use and will not injure aluminum heads, fittings, rubber hose or any parts of the cooling system. Retail price 25c.

Whiz Clean Flush is a concentrated flushing compound in powder form which the manufacturer, R. M. Hollingshead Corp., Camden, N. J., claims thoroughly cleans the cooling system, dissolving and removing

Fittings For Individual Cars

E. Edelmann & Co., 2332 Logan Boulevard, Chicago, Ill., has announced the introduction of an assortment of brass fittings and fuel lines for individual cars. The assortment is arranged in a drawer which can be attached to the underside of the counter or bench, and a blue print manual shows the location and part



number of each fitting for that particular car. The assortment is designed for the car dealer or repair shop which services only one or two makes of cars, and eliminates the necessity of carrying as assortment of parts which do not apply to those particular cars. Special introductory price, \$12.65.

Coil Has Spark Control



A new coil which, it is claimed, delivers a super hot spark to the motor for just long enough to start the engine, and then drops to normal output has been announced by Standard Motor Products, Inc., Long Island City, N. Y.

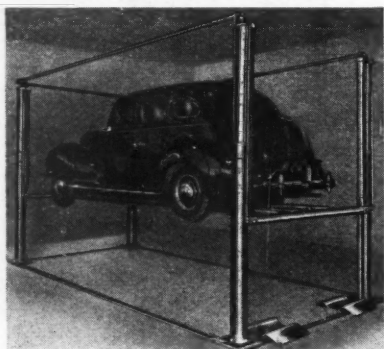
This feature is due to a built-in precision timer and compensator, according to the manufacturer—the compensator designed to keep the time element constant regardless of the outside temperature. The new coil is encased in a copper-colored container with horizontal ribs, and is equipped with "triple-protection" water-proof top.

NEW profit makers

PARTS TOOLS EQUIPMENT ACCESSORIES

Joyce 4-Post Lift

The Joyce-Cridland Co., Dayton, Ohio, announces the new Joyce Marketeer, a completely portable 4-post lift. No excavation is required; the unit is provided with positive



rack and gear equalization which automatically levels the superstructure regardless of weight distribution. The lift is available in both drove-on and free-wheel models, arranged for either electric operation or for air operation.

Repairs Cracked Blocks

A product known as Mendall Metal has been placed on the market for national distribution by 4-A Products, Denver, Colo. It is designed to repair cracks in cylinder heads or blocks, transmission cases, water pumps, etc. According to the manufacturer, all that is required is a blow torch with which to heat the crack to about 250



deg., which is less than red heat. Then touch the crack with the stick of

Mendall Metal. The metal is drawn into the crack, filling it and adhering to the metal on each side. This product is not intended for use where tensile or mechanical strength is required. Mendall Metal comes in a container holding six sticks or bars, and is priced at \$5.

Handy Super Servicer

The Baldor Electric Co., 4351-59 Duncan Avenue, St. Louis, Mo., announces development of a battery tester and charger which is named the Handy Super Servicer. This machine, according to the manufacturer, performs a variety of battery services: tests batteries in 1 min., charges them



in the car in from 30 to 45 min., gives an emergency boost to a battery in 2 to 5 min. to give it enough power to turn the starter over. Equipped with a time switch, the initial charge is about 75 amps., and when the switch cuts off the charge drops to 6 amps. and continues until the battery is disconnected. The unit is mounted on large rubber casters to make it easily portable.

Brake Service Kits

Wheel and master cylinder hydraulic brake service parts are now available to the trade in attractive merchandising cartons by the Supco Products Corp., 109 West 64th Street, New York City. Complete coverage



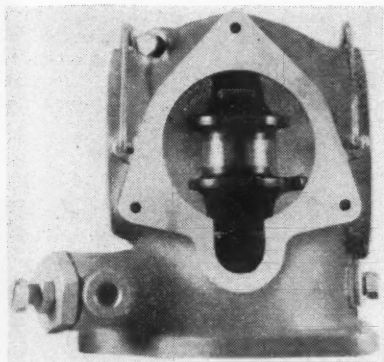
for Chevrolet, Plymouth, Ford, Dodge, DeSoto, Chrysler, Pontiac and Oldsmobile cars are provided in three sizes of merchandisers containing six, nine and twelve wheel and master cylinder repair kits, according to the manufacturer.

Park Has New Products

Two of the latest products added to the line of chemical specialties made by the Park Chemical Co., Military and Vancouver Ave., Detroit, are Parko Solvent cleaner for carburetors and fuel pumps, and Parko Synthetic Enamel cleaner for cleaning and polishing synthetic enamel finishes. The solvent cleaner cleans by cold immersion, is non-explosive and has no disagreeable odor. The Synthetic Enamel cleaner contains polishing and color-blending ingredients in addition to a very soft abrasive sufficient to remove road film, etc., without scratching the finish.

Distributor Exchange Announced by Shurhit

Shurhit Products, Inc., Waukegan, Ill., is offering to the trade a reconditioned distributor for Ford V-8 cars on an exchange basis. The contact points and vacuum brakes on all Shurhit exchange distributors are properly set and the governor advance check on the Shurhit Stroboscope at the factory. All distributors are thoroughly tested and guaranteed to function properly. Display easels are available free of charge to jobbers of Shurhit products to call this exchange service to the attention of the trade.



Bracket for Auxiliary Lights

A new bracket for auxiliary lights is being offered by A-Lin-A-Lite Corp., 2548 Elmwood Ave., Buffalo, N. Y. This bracket will fit any auxiliary light and any automobile, including the 1941 models. It is installed so that the light turns with the front wheels, throwing the light in the actual direction of the car movement. List price \$5.45.

Blow-Torch Operates From Shop's Air Line

A new type of blow-torch, known as the Safety Vacuum Jiffy hand torch has been announced by Mahr Mfg. Co., Division of Diamond Iron Works, Inc., Minneapolis, Minn. This new torch operates from any air line having a pressure of 30 lb. or more. Burns kerosene or light fuel oil, and produces a flame adjustable from a short intense flame to one 5 ft. long. The compressed air draws the fuel into the burner by vacuum and completely atomizes it. Torch requires no pre-heating.



Displays Imperial Radiator Drain Cocks

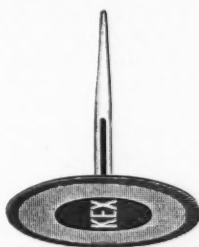


These drain cocks are fitted with an extension for attaching a piece of $\frac{1}{4}$ in. rubber tubing so that the owner can drain off the anti-freeze solution and store it in a jar for future use. The display contains 12 items, screwed into the metal display board so that they can readily be removed when sold.

A new counter display, showing Imperial's special thrift drain cocks, has been made available by The Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.

Tire Plug

A new and large tire repair plug has been added to the Kex line of automotive specialties manufactured by The Wedler-Shuford Co., 2222 Olive Street, St. Louis, Mo. An entire new principle in patch head design is used, according to the manufacturer. The top side or surface is convexed for a perfect fit into the concaved



inner walls of the casing, giving a solid support under the fabric break without air pockets, and entirely eliminates the pull back on the sealing stem. The new plug, known as No. 14Q Super Kex

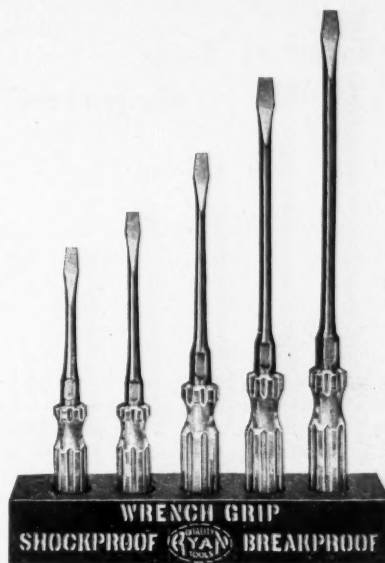
tire plug has a 4-in. patch head and $\frac{5}{16}$ in. diameter sealing beam.

Mufflers Feature Quiet Performance

A new line of Hy-Power Ultra-Quiet mufflers is being introduced by Lion Auto Parts & Mfg. Co., 1920 South Michigan Ave., Chicago, Ill. Crimped locked seams and rolled beads are said to make these mufflers leak-proof and blowout-proof, and provide complete protection against carbon monoxide gas. Low back pressure, cool operation and smooth, quiet performance are features claimed by the manufacturer. Hy-Power mufflers has a golden finish. and have a gold foil Unconditional Guarantee Label.

Heavy Duty Screw Drivers

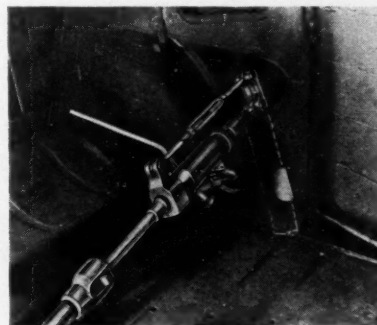
A line of screw drivers with plastic handles has been announced by The James J. Ryan Tool Works, Southington, Conn. Made in five sizes from a 4-in. to a 10-in. blade, these new screw drivers have blades of alloy tool steel and have a full-sized hexagon shoulder so that a wrench can be used as an aid in turning tight screws. The plastic, amber-colored handle is made



with deep flutes to afford a firm grip, and is said to be non-breakable. The blades are highly polished and treated with a rust preventive to insure against rust and tarnish. A display stand is available to properly displaying the complete line.

Hydraulic Spoon For Body Work

A hydraulic rocker spoon for pressing dents out of body panels has been developed by H. K. Porter, Inc., Everett, Mass. The rocker action of the press permits the spoon to adjust



itself to the right angle so that dents are pushed out to the original form of the panel. It can be used within the body of the car, or on the bench. Then, too, the spoon forms a firm, easily located anvil for hammering out small dents.

NEWS

"Turret Top Repairs"

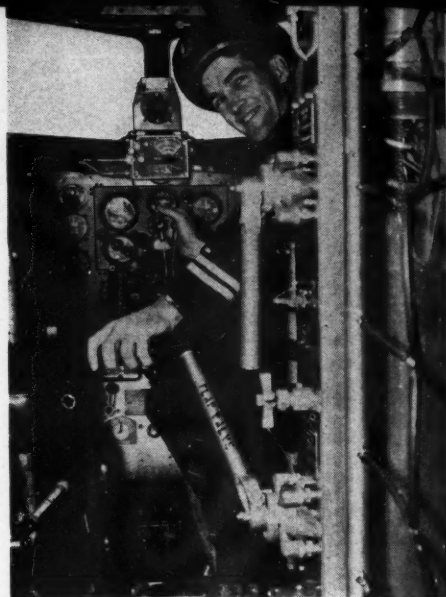
An Apology

In October, 1940, the Editor of MOTOR AGE received from Clarence C. Hurley, as an unsolicited article, a manuscript accompanied by a set of photographs dealing with the repair of turret tops. In the ensuing correspondence with Mr. Hurley regarding the article there was no intimation from him that it was not an original contribution, submitted exclusively to MOTOR AGE. As a matter of fact, however, the article, which was printed in our January, 1941, issue, had previously appeared with its accompanying photographs in the March, 1940, issue of our esteemed contemporary, MOTOR SERVICE, published in Chicago. MOTOR AGE accepted and published the article in good faith as an original contribution. The article would not have been published in MOTOR AGE if the facts regarding it had been known by the editor either at the time of its acceptance or its publication. And it can be said also that, if conditions had been reversed, MOTOR SERVICE would not have published it. We extend to MOTOR SERVICE our deepest apologies.

Industry Geared to Aid National Defense Program

Automobile companies will be turning out high powered airplane engines for military aircraft at a rate of better than 3000 monthly by next December, according to an estimate based on the potential capacity of plants now in operation or under construction. The Allison Division of General Motors at Indianapolis is the only such plant now in production, having an output of 350 liquid-cooled engines in January. The 3000 total for next winter compares with an output of 2400 engines last December by all United States manufacturers, including smaller units for training planes as well as higher horsepower engines.

Allison expects to boost its production rate to 1000 engines per month by December, 1941. Buick will turn out 500 Pratt & Whitney 1200 h.p. engines monthly in its new plant, while Studebaker is expected to produce approximately the same number of Wright 1400 h.p. engines. Packard's capacity will be 800 Rolls Royce Merlin 1200 h.p. engines per month in its new Detroit factory, which is scheduled for completion in August. Ford is likely to attain a rate of 350 Pratt & Whitney 2000 h.p. twin Wasp engines monthly in its new plant at



DIVING DEMON Lieut. A. C. McDonough, transport pilot, back on the job after power diving a Bell Standard P-39 Airacobra at 620 m.p.h. in a recent army test.



SCHOOLS OVERTIME The Brooklyn High School of Automotive Trades has scheduled adult trade courses from 10 p.m. to 5 a.m. in addition to evening courses.



SNOW SCULPTURE College fellows go in for all sorts of ways to pass the winter hours in between classes. At Dartmouth there is an unusual competition among the young men who go in for snow sculpture. This old car modeled in snow was a prize winner.

River Rouge, due for completion late in March.

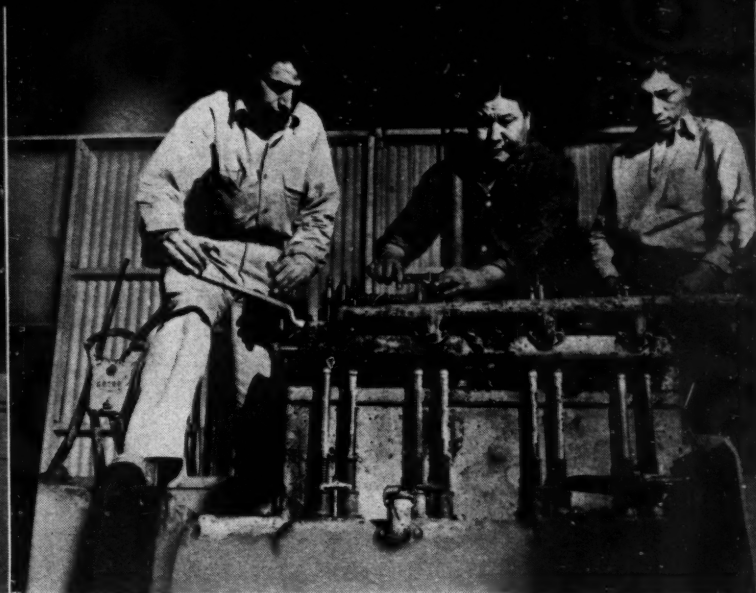
The fire aircraft engine divisions of these motor car manufacturers are expected to employ 62,500 workers when full production is achieved.

While 1942 models are anticipated they will undoubtedly be affected by national defense commitments. An indication of the latter necessity comes from a statement of W. S. Knudsen of the OPM in Washington, in advising manufacturers to leave some of the chrome off the 1942 models in order to conserve zinc, a strategic defense material.

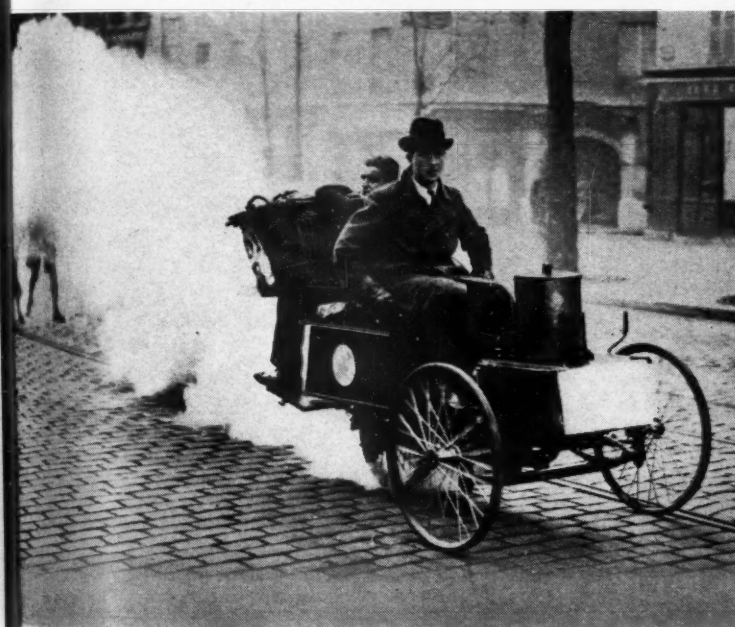
(Continued on page 88)



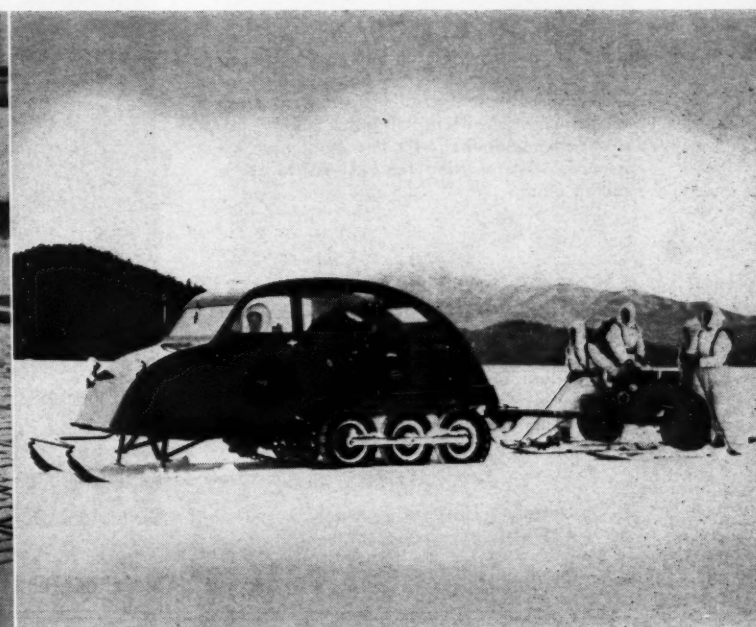
INAUGURAL PARADE State governors participating in the inaugural parade in Washington rode in a mile-long fleet of new Fords. Governors' cars carried special inaugural license plates and were identified by state banners. 140 Fords paraded.



INDIAN STUDENTS Real, red-blooded Americans who are aiding in United States defense activities are these three Indian students, enrolled in the Tractor and Diesel department of the Phoenix Indian School, Phoenix, Ariz. Gladly do they lend a hand.



OUT OF THE MOTH BALLS comes this ancient steamer shown making the rounds in Paris recently. It is being used to collect baskets of contributions to the Winter Help Fund. Car is said to be the first steam driven car by Dion-Bouton.



FOR WINTER DEFENSE Defense preparations under any circumstance of the weather is indicated by this specially constructed ski-mobile which transports a ski-mounted anti-tank gun with ski troops over snow-covered terrain at Lake Placid, N. Y.

A.M.A. Cancels National Automobile Show; Dealers May Consider Showing in New York

The Automobile Manufacturers Assn., through its president, Alvan Macauley, formally announced the cancellation of the National Automobile Show, originally scheduled for Grand Central Palace, New York City, next October. Defense commitments made by the manufacturers and a pledge given the Government to subordinate model changes to defense work were stated as reasons for the move.

It is understood that many manufacturers are well advanced in planning and designing their 1942 lines and, at the present time, no cancellation of new models is expected.

Prior to the A.M.A. announcement, Joseph W. Frazer, president of Willys-Overland Motors, Inc., urged that "all national automobile shows be eliminated entirely during the period of our national emergency and that 1941 models carry into 1942." It

is understood that Willys-Overland will follow the policy established through the later announcement by the president of A.M.A.

Macauley told N.A.D.A. officials in a telegram that some model changes may be expected where they will not interfere with the defense program but the production of factory made special show displays and demonstration apparatus will be eliminated.

The subject of local shows, sponsored by car dealers in many localities, was widely discussed at the meeting of the Automotive Trade Assn. Managers in Pittsburgh last

(Continued on page 88)



BRAZILIAN ATTENDANT While we don't recommend this as being a super-service method, it must be quite comfortable for the heat frustrated gasoline attendant down in Brazil, where, at this time it's plenty hot. Comfort comes first with this gentleman especially while waiting for business to come rolling along.

SUPER HIGHWAY Los Angeles and Pasadena were brought minutes closer together and congested traffic alleviated when this modern super-highway was opened recently. This air view of the trafficway shows how it eliminates intersections and two-way traffic.

Cargile Heads N.A.D.A.; 800 Attend Convention

National defense-minded car dealers met for the annual convention of National Automobile Dealers Assn. in Pittsburgh, last month. Well over eight hundred were registered at the convention desk.

Dealer shows (discussed elsewhere in this issue) were a topic of corridor conversation, while the highlights of the convention proper were the discussion of the wage-hour law and its application to dealer operations; "volume merchandising"; dealer licensing; management; and dealer cooperation in the national defense movement.

Henry R. Luce, editor of *Time*, *Life* and *Fortune* magazines, who was the banquet speaker, told dealers that America is already a participant in the world war and urged "an end to deceit and self-deceit" on the question of participation. Luce called upon the United States to "state its war aims for the entire world to see," and

"accept wholeheartedly our duty and our opportunity as the world's most powerful and vital nation."

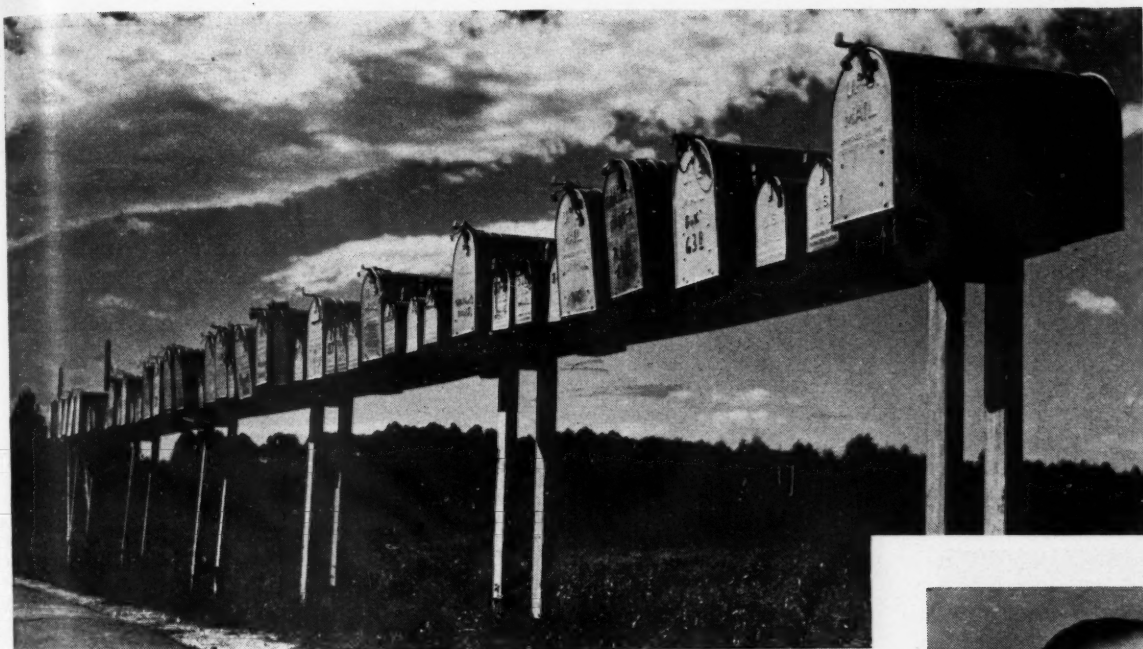
Other convention speakers were Donald R. Richberg, special counsel for N.A.D.A.; A. O. Dietz, president, Commercial Investment Trust Corp.; J. B. Van Tassel, business consultant, Chicago Automotive Trades Assn.; Howard V. Clark, manager of sales, sheet division, Carnegie-Illinois Steel Corp.; Philip M. Klutznick, counsel, Nebraska Automobile Dealers Assn.; Charles Kensinger, dealer, Memphis, Tenn.; John R. Battle, dealer, New Orleans, La.; Charles W. Bishop, general counsel of N.A.D.A.; Lake Hays, Memphis, Tenn.; as well as retiring officers, Stanley Horner, president; Jack Schiott, secretary; D. E. Castles, treasurer.

New officers for the coming year are: L. C. Cargile, president; Harry Sommers, first vice-president; Arthur E. Center, secretary, and D. E. Castles (re-elected), treasurer. Chicago is the next N.A.D.A. convention city.



New Passenger Car Registrations

	NOVEMBER		NOVEMBER	ELEVEN MONTHS		Per Cent Change, 11 Months, 1940 over 1939	Per Cent of Total Eleven Months		TWO MONTHS MODEL YEAR		
	1940	OCTOBER 1940	1939	1940	1939		1940	1939	1941	1940	Per Cent Change
Chevrolet	72,011	71,689	59,520	764,533	533,522	+ 43.4	24.81	22.17	143,700	84,766	+ 69.5
Ford	48,412	41,761	46,005	489,935	436,211	+ 12.2	15.90	18.12	90,173	80,505	+ 12.0
Plymouth	37,452	41,517	11,772	402,472	331,932	+ 21.3	13.06	13.79	78,969	49,338	+ 60.2
Buick	27,951	32,283	26,863	286,755	194,410	+ 37.1	8.66	8.08	60,234	50,385	+ 19.6
Pontiac	23,817	22,576	17,741	210,672	141,328	+ 49.0	6.84	5.87	46,393	31,921	+ 45.1
Dodge	15,785	10,273	3,570	179,668	166,809	+ 7.8	5.83	6.93	26,058	17,343	+ 50.0
Oldsmobile	19,887	18,627	16,780	179,516	129,615	+ 38.6	5.83	5.39	38,514	29,968	+ 28.2
Studebaker	8,057	10,113	8,741	93,534	76,238	+ 22.8	3.04	3.17	18,170	17,317	+ 5.0
Chrysler	9,702	6,486	2,184	88,696	60,262	+ 47.1	2.88	2.50	16,188	8,367	+ 93.5
Hudson	6,056	8,044	8,671	73,752	55,184	+ 33.8	2.39	2.29	14,102	16,911	- 16.6
Mercury	6,996	4,759	6,661	72,573	58,416	+ 24.2	2.36	2.43	11,755	10,982	+ 7.0
Packard	5,813	7,046	7,969	68,116	55,147	+ 23.6	2.21	2.29	12,859	16,255	- 21.0
De Soto	6,102	4,820	2,019	64,946	49,037	+ 32.6	2.11	2.04	10,922	6,746	+ 62.2
Nash	4,427	2,534	4,844	46,689	49,273	- 5.1	1.52	2.04	6,961	9,127	- 23.8
Willlys	1,783	1,418	2,107	19,773	12,917	+ 53.2	.64	.54	3,201	3,971	- 19.4
Lincoln	1,767	1,859	1,903	19,187	17,817	+ 7.5	.62	.74	3,646	3,174	+ 15.0
Cadillac	4,391	3,590	1,267	16,733	11,611	+ 44.0	.54	.48	7,981	2,227	+ 258.0
La Salle	157	381	2,736	16,471	19,731	- 16.6	.53	.82	538	4,277	- 87.4
Graham	180	201	60	1,706	3,612	- 52.7	.06	.15	381	202	+ 89.0
Bantam	29	48		774			.03		73		
Crosley	31	40		400			.01		79		
Hupmobile	46	40			900	- 80.2		.04	86	33	+ 160.0
Miscellaneous	556	386	145	3,936	2,861	+ 37.6	.13	.12	942	342	+ 175.0
Total	301,430	290,495	231,571	3,081,016	2,406,833	+ 28.0	100.00	100.00	591,925	444,157	+ 33.5
Chrysler Corp.	69,041	63,096	19,545	735,782	608,040	+ 21.0	23.88	25.26	132,137	81,794	+ 61.8
Ford Motor Co.	57,195	48,379	54,569	581,695	512,444	+ 13.3	18.88	21.29	105,574	94,661	+ 11.5
General Motors Corp.	148,214	149,146	124,907	1,454,680	1,030,217	+ 42.1	47.22	42.81	297,360	203,544	+ 46.1
All Others	26,980	29,874	32,550	308,859	256,132	+ 20.6	10.02	10.64	56,854	64,158	- 11.4



Readers from cities and crossroads—write the Editor of Motor Age

THE READERS'

CLEARING HOUSE

of Servicemen's Queries



Bill Toboldt, Editor, Motor Age

HARD STARTING

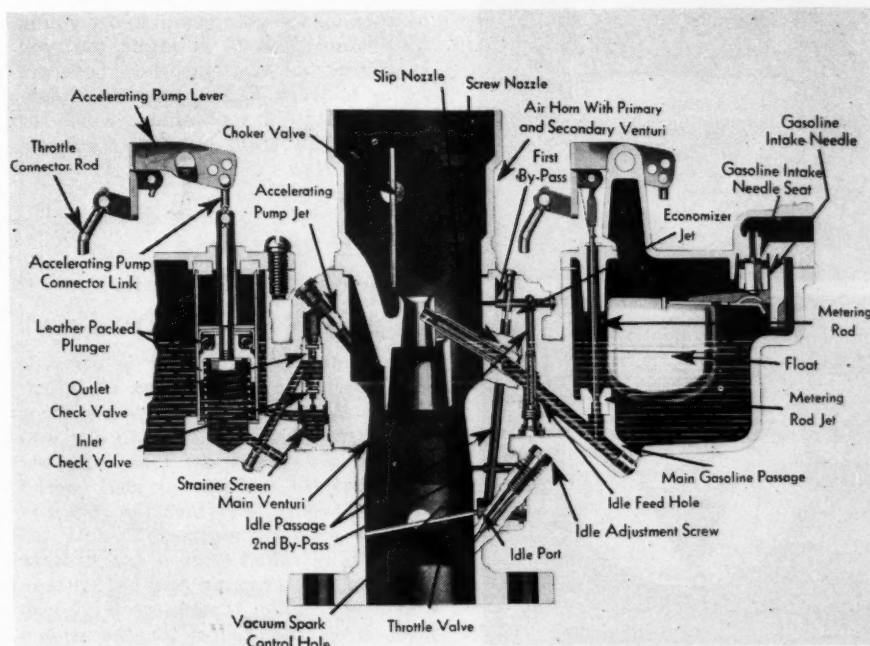
A Chevrolet truck owned by one of my customers will run well either hot or cold, but starts very hard when the engine is hot. It starts easily when the engine is cold. Can you give me any suggestions as to the cause of this trouble? R. M. Pratt, Loyal, Wis.

THE most usual cause of hard starting when the engine is hot is vapor lock. In other words, the fuel in the carburetor is vaporized before it actually reaches the jet. This is the result of too much heat. The excess heat might be applied either at the fuel pump, the fuel line or to the carburetor itself. I would suggest that you install an asbestos gasket about $\frac{3}{8}$ to $\frac{1}{2}$ in. thick between the carburetor and the intake manifold so as to reduce the amount of heat at the carburetor. Also make sure that the fuel line does not pass too close to the exhaust pipe at any point.

Incidentally, trouble of this sort is most usually encountered during the summer months, and can sometimes

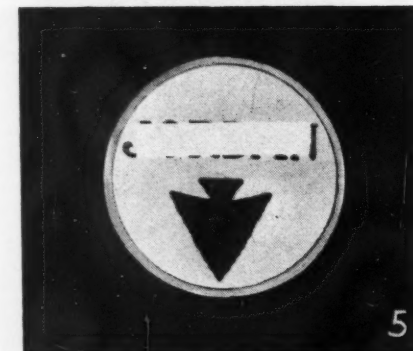
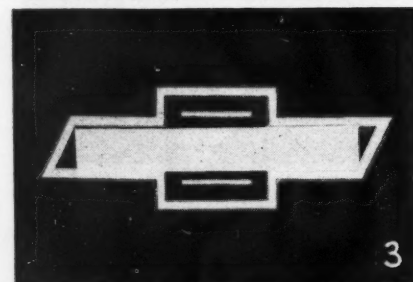
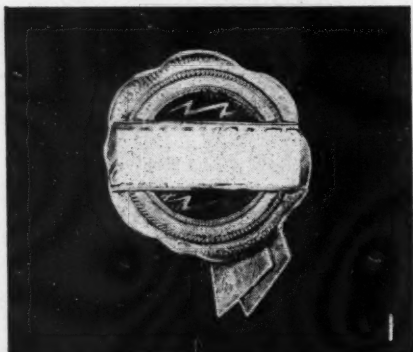
be overcome by using a different brand of gasoline.

In addition to the foregoing, I would suggest that you carefully go



RECOGNIZE THEM?

Here are a few famous automobile nameplates and emblems. Names have been blanked out, but see if you can recognize them. Identification will be found on page 67.



over the intake manifold to make sure that the gaskets are all tight.

In some instances, similar difficulty is caused by a defective coil or a coil that is mounted in such a position that it becomes excessively hot from the heat of the engine. You might try another coil or try mounting the present coil in a cooler location underneath the hood.

ANOTHER MECHANIC LINES UP FOR NATIONAL DEFENSE

In the January issue of *MOTOR AGE*, Cliff Oppel of Duluth, Minn., gives some of the things that should be done in the interest of National Defense, and I am in accord with him.

He speaks of one company saying they can make a mechanic in six weeks. I do not agree with them. In the first place they do not recognize a man as a mechanic around here unless he can tear a car down from stem to stern and put it back together again; not just one make of car, either. You are supposed to be able to take them as they come, and it would take six weeks for a greenhorn to figure out how to get the pan off all of them.

Now I am 33 years old, and have been working on cars since I was 16, have too few teeth of my own, and besides my number is way up on the list to get caught in the draft very soon.

I would be willing to work on an airplane engine for a week free of charge, and if they are so kind as to give me the measurements and clearances I'll bet that by the end of that week they could throw that engine out on the floor in little pieces and I could put it back like it should be. I doubt if a new comer would be able to do this.

I see in our local paper that the local college is going to instruct young men from 18 to 23 at night, and you can figure out how long those boys are going to work before they are ready to help out on mechanical work for National Defense. — Joe Halloran, Topeka, Kan.

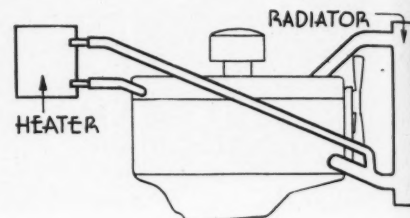
HOT WATER HEATER, BUT NO HEAT

I have a 1934 Ford car in which a hot water heater has been installed. The cooling system is fitted with a thermostat that opens at 150 degrees. I have changed hose lines, and am sure that the radiator as well as the heater is clean, and that the pump is doing a good circulating job.

I have installed quite a few heaters on Ford V-8 engines, but have never had this trouble. I connect the lower hose from the heater to the upper

radiator hose between the pump and the thermostat, and the upper heater hose to the top of the cylinder head. Can you tell me what is wrong in this particular case? Penrose Christian, Mt. Penn Garage, Mt. Penn, Reading, Pa.

THERE are three things about this hook-up which I think could be improved. First of all, you should have a 180 degree thermostat instead of one that opens at 150 degrees. Next, I believe you will have better luck if you will connect the lower heater hose to the cylinder head, and



the upper heater hose to the radiator outlet hose at the bottom of the radiator. The next point I would check would be to bleed the upper heater hose where it joins the heater to be sure all of the air is released. You know, of course, that it is very easy to get heaters air-bound, and when this condition occurs there is no circulation, and without circulation there is no heat.

LOW COMPRESSION PRESSURE

I would like some help on a 1937 DeSoto.

Three sets of rings have been installed, yet in no case has the compression been over 70 lbs. per cylinder. Each time we have torn down the engine, the top ring has seemed dry. With an oil seal compression test, the pressure is up to normal or above.

The car probably has been driven about 80,000 miles—anyway it is .040 in. oversize. There is almost .006 in. wear, pistons are clean and while the engine seems to have some blow-by it uses only about a quart of oil per 1000 miles of driving. Gas mileage is good, and valves are in good shape. W. G. Hurl, Hawthorne Ave. Garage, Portland, Ore.

JUDGING from your description I am inclined to believe that the reason you are unable to bring up the compression pressure in this engine is that the cylinders are worn out of round so badly that the new piston rings cannot compensate for the wear. In my opinion, the only way you will ever be able to restore this engine to normal operating condition is to recondition the block, install oversize pistons and a new set of rings.

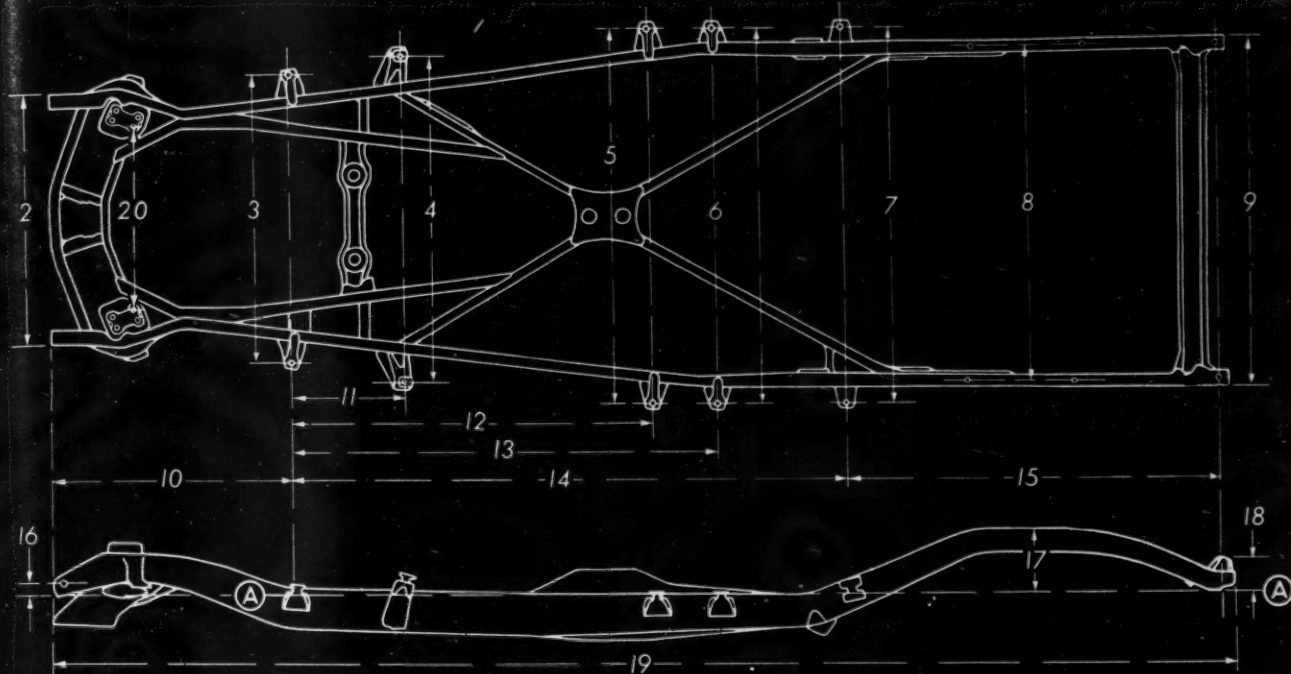


Fig. 161—Frame Alignment (Dimensions given in inches)

A—Top line of frame	6— $52\frac{13}{32}$ ($52\frac{17}{32}$ —7 Pass.)	11— $14\frac{23}{32}$	16— $1\frac{3}{8}$ ($1\frac{11}{32}$ —7 Pass.)
2— $35\frac{1}{16}$ —7 Pass.)	7— $52\frac{1}{16}$ ($52\frac{1}{8}$ —7 Pass.)	12— $50\frac{1}{32}$	17— $9\frac{3}{8}$
3— $40\frac{1}{16}$	8— $46\frac{1}{4}$	13— $59\frac{1}{32}$	18— $5\frac{1}{16}$
4— $45\frac{3}{8}$ ($45\frac{11}{16}$ —7 Pass.)	9— $48\frac{1}{4}$ ($48\frac{1}{2}$ —7 Pass.)	14— $77\frac{1}{32}$ ($94\frac{27}{32}$ —7 Pass.)	19— $164\frac{3}{8}$ ($184\frac{13}{32}$ —7 Pass.)
5— $52\frac{3}{8}$	10— $34\frac{11}{32}$	15— $50\frac{13}{16}$ ($53\frac{13}{16}$ —7 Pass.)	20— $26\frac{1}{32}$

Frame diagram, 1941 Plymouth. (Dimensions are in inches)

BEARING TROUBLE

We have completely overhauled one 1937 Plymouth motor, installing new piston rings and pins, connecting rod bearings, main bearings and valves. We checked the crankshaft of this car and found it in good shape, being perfectly round and all oil passages open.

After completing this job the car was driven approximately 300 miles when number 3 connecting rod bearing broke down. We disassembled the motor, replaced all of the connecting rod bearings and then after the car was driven approximately 25 miles, No. 3 and No. 4 rod bearings pulled out. We then tore the motor down and have checked it completely, namely the main bearings and the balance of the connecting rod bearings, the crankshaft and every possible phase of the motor that we can think of, without finding anything wrong.

We should like to know your opinion of all the possible reasons for these connecting rod bearing failures. Thomas B. Ricker, Greenbelt, Md.

I BELIEVE the trouble in this case is that someone has filed these connecting rod bearing caps so that when you installed the new bearing inserts and tightened the caps it caused a crush fit of the bearing inserts. I be-

lieve it will be necessary for you to install new connecting rods in order to overcome this trouble.

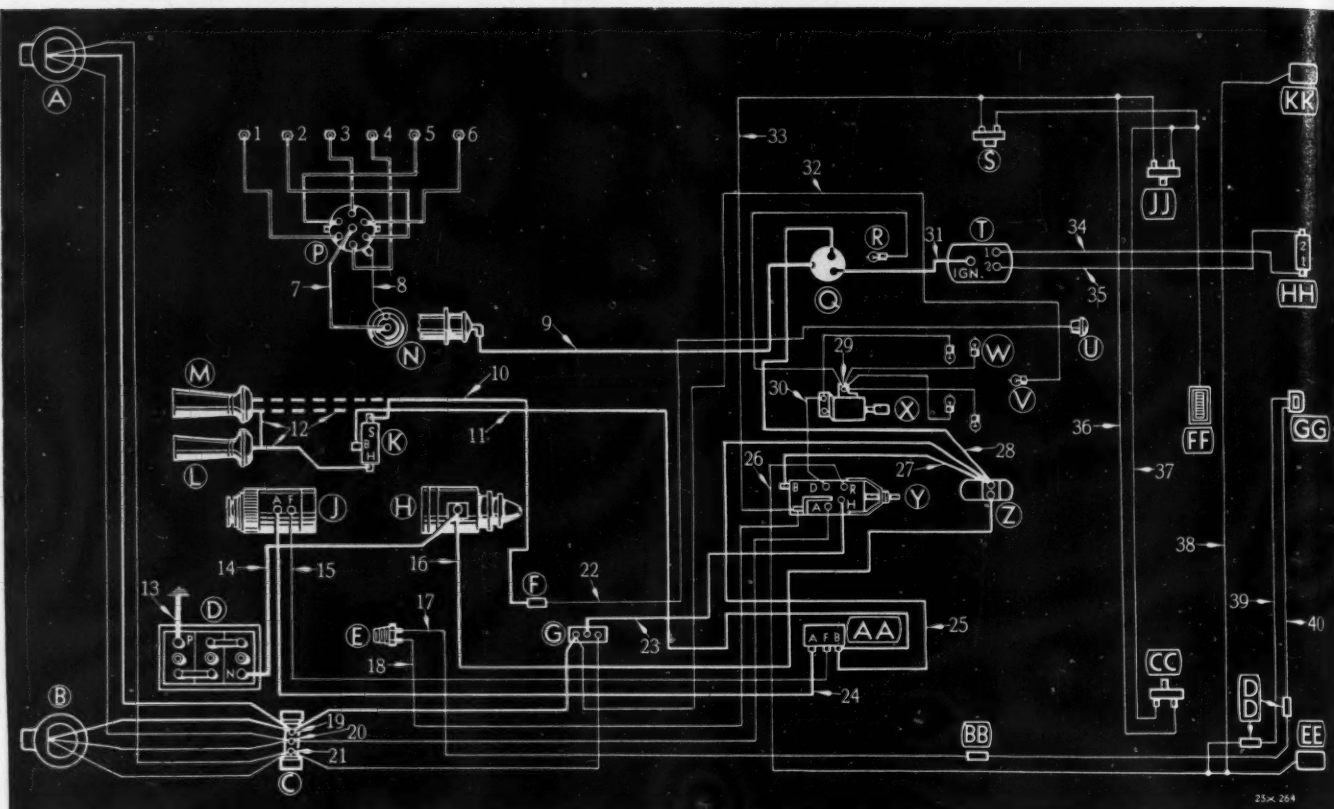
You might try installing shims on



"No! There is no 90-day guarantee, and you can't bring the merchandise back for credit!"

the bearing caps if the owner will not stand the expense of new rods. In order to do this it would be necessary to bolt the cap onto the rod with the insert bearings left out, and then with an inside micrometer, measure the diameter of the bearing end of the rod in both directions. If the vertical diameter is less than the horizontal diameter, it will indicate just about how much metal was filed off the bearing cap. Then, if you will get a shim of the thickness represented by the difference between the horizontal diameter and the vertical diameter and install the shims, one on each side of the bearing cap, it should restore the connecting rod to a true circle. Then it would be possible to use this rod with new bearing inserts without the danger of crushing the inserts out of round when the cap is tightened to the rod.

There is another possibility in this case, and that is that the oil pressure is low after the engine warms up, due to the fact that too much oil is being thrown off by the camshaft bearings. There is a metering jet available that can be installed in the oil passage from the main bearings to the camshaft bearings which will meter the amount of oil sent under pressure to the camshaft bearings, and this will help to restore the oil pressure to normal.



Wiring diagram, 1941 Plymouth

- | | | | | | |
|----------------------------------|----------------------------------|------------------------------------|---------------|---------------------|----------|
| A—Headlight, right | R—Ignition switch light | EE—Tail light, left | FF—Dome light | 17—Red | 26—White |
| B—Headlight, left | S—Dome light pillar switch | GG—License and signal light | | 18—Red | 27—Brown |
| C—Headlight cable terminal block | T—Fuel gage panel unit | HH—Fuel gage tank unit | | 19—Red | 28—Brown |
| D—Battery | U—Horn push button | JJ—Automatic door switch, right | | 20—Yellow | 29—Black |
| E—Signal light switch | V—Headlight beam indicator light | KK—Tail light, right | | 21—Black | 30—Black |
| F—Horn button cable connector | W—Instrument lights | 1-6—Spark plug cables | | 22—Black | 31—Blue |
| G—Headlight dimmer foot switch | X—Instrument light switch | 7—Secondary cable | | 23—Yellow | 32—Brown |
| H—Starting motor | Y—Main lighting switch | 8—Primary cable (black) | | 24—Red | 33—Red |
| J—Generator | Z—Ammeter | 9—Ignition switch cable | | 25—Black | 34—Blue |
| K—Horn relay (dual horns) | AA—Voltage regulator | 10—Green 11—Red 12—Green | | 35—Black and yellow | |
| L—Dual horn | BB—Cable connector | 13—Battery ground cable (positive) | | 36—Red | 39—White |
| M—Single horn | CC—Automatic door switch, left | 14—Starter cable (negative) | | 37—Yellow | 40—Red |
| N—Ignition coil | DD—Cable connectors | 15—Green 16—Red | | 38—White | |
| P—Ignition distributor | | | | | |
| Q—Ignition switch and lock | | | | | |

CLUTCH TROUBLE

I am having a lot of clutch trouble on a 1939 Cadillac 60, and I wonder if you can help me out.

This clutch does not release properly. With the car standing still and the engine running, it is necessary to hold the clutch down a half a minute before the low speed gear can be engaged without clashing. We know that this is not right, as I have worked on several other Cadillac and LaSalle cars and they did not have this trouble.

This is a brand new clutch, and everything checks properly. I even adjusted the clutch pedal at the toe board with less clearance than it should have. This is the third new clutch that has been installed in this car, and they all work the same.

I have even tried heavy grease in the transmission to stop the shaft from turning. I have had the clutch out the second time and checked it on a jig, and can find nothing wrong; I also checked the face of the flywheel with a dial indicator for running true.

The pilot bearing in the flywheel is O.K., and the clutch disc slides freely on the pilot shaft. Jos. L. Buote, Providence, R. I.

THERE are two things I would suggest doing to this job; first, check the clutch shaft for running true and second, adjust the clutch throwout fingers to increase the travel of the clutch pressure plate. I am inclined to believe that the trouble is caused by the adjustment of these three throwout fingers rather than any other single cause, since you have a new driven disc and have checked the surface of the flywheel for being clean and true running. These fingers can be adjusted closer to the driven disc so that with the full throw of the clutch pedal they will pull the pressure plate farther away from the flywheel.

The clutch pedal should be adjusted to have not more than 1½ in. free travel measured at the pedal pad before the clutch starts to disengage. It can be set up as close as ¾ in. free travel.

KNOCK IN ENGINE

Would appreciate any help you may give us in finding the knock in a 1939 Plymouth engine.

The car started using oil at about 10,000 miles, and a new set of rings were installed. It soon developed a knock. This was thought to be a loose bearing, so the owner had all new rod and main inserts installed, .001 in undersize, but the knock was still there.

The job then came to me, and I thought it was a broken piston so I pulled the pistons and found a broken ring and ring land on No. 2 piston, and a broken ring on No. 4. No. 2 cylinder was scored so we rebored the motor and installed pistons and rings .040 oversize. The rods were checked and No. 5 was badly twisted and so we lined it up, but the knock was still there.

It seems to be in No. 4 or 5 piston. We have pulled the pistons again and No. 5 was found to be off on alignment, so we put in a new rod and insert. Still the knock. This knock shows up at from 40 to 50 miles per hour,

loudest at 45. Sounds to me like a piston, but am wondering if it could be in No. 3 camshaft bearing. As it is hard to get these parts here and there is a lot of work involved in removing and replacing the camshaft, I would like to have your advise before tearing the engine down again. Owen Lewis, Wauneta, Neb.

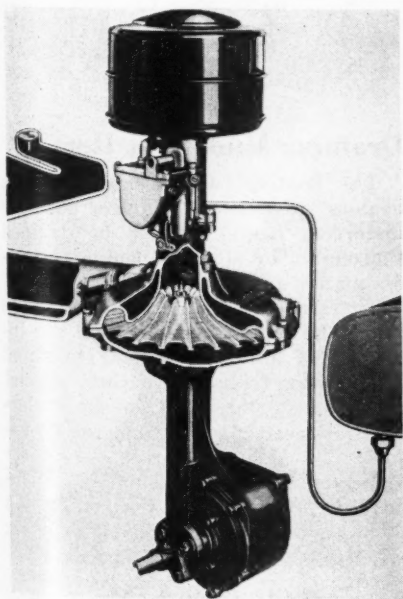
I DO not believe you will find the trouble in the camshaft bearing. To the best of my knowledge very little difficulty has been experienced with camshaft bearings in this model. I believe that this is purely a connecting rod bearing knock.

I suggest that you pull the pan and pull No. 4 and No. 5 connecting rods and mike the crankshaft bearing journal. If you find this more than .002 in. out-of-round, the shaft should be turned true and the proper undersize bearing fitted. Also check the clearance between the edges of the connecting rod and the sides of the crankshaft bearing journal. It is possible that this rod is floating end-wise on the shaft and causing a misaligned condition. However, I believe you will find the trouble in the fit of the connecting rod bearing.

OIL LEAK AT SUPERCHARGER

I would appreciate any and all information you can send me concerning an oil leak at the upper part of a supercharger on a 1937 Graham Model 116, and any other information on the supercharger itself. W. Locke, Scott & Locke, Chester, Pa.

AN oil leak at this point very likely means that the upper oil retainer is worn, and should be replaced. In



order to do this it is first necessary to disconnect the throttle linkage, the choke wire, the gas line and the

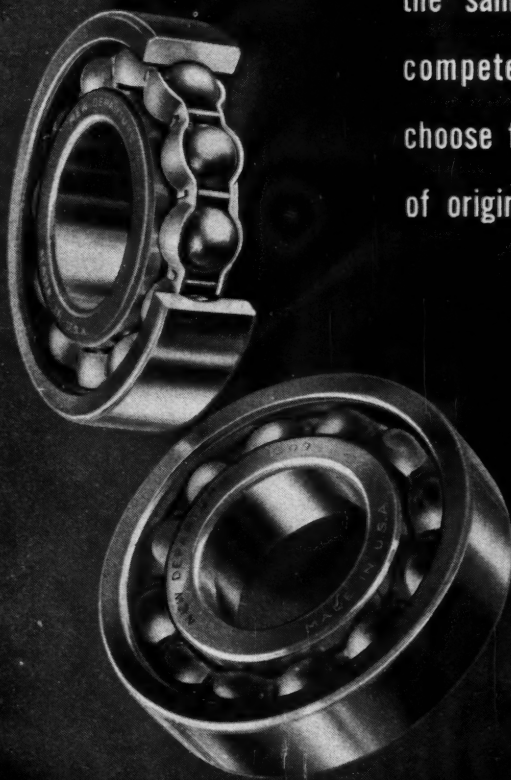
vacuum advance tube at the carburetor. Then remove the screws which fasten the cover on the supercharger and remove the cover and the carburetor as a complete unit. Next remove the nut from the vertical shaft, and remove the rotor. It is important that you do not pry the rotor off the shaft; the proper way to remove this rotor is to use two pliers and grasp the rotor by the blades on opposite sides of the center and pull straight up. It may be necessary to tap the shaft lightly as you pull in order to free the rotor from the shaft. With the rotor off you will see the oil retainer around the shaft, pressed into the lower half of the housing.

This retainer should be removed and a new one installed.

While you have the rotor off the shaft and the oil retainer out, it is a good idea to check the shaft for wear in the bushings. If these bushings are worn sufficiently to let the shaft wobble, they should be replaced. There are three bushings on the vertical shaft—one at the top, one in the center and one at the bottom. These bushings have to be reamed after they are installed in the housing.

The end play of the vertical shaft should not exceed .002 inches, and is adjusted by installing or removing washers of various thicknesses on the lower end of the shaft.

Replace it with a New Departure . . .

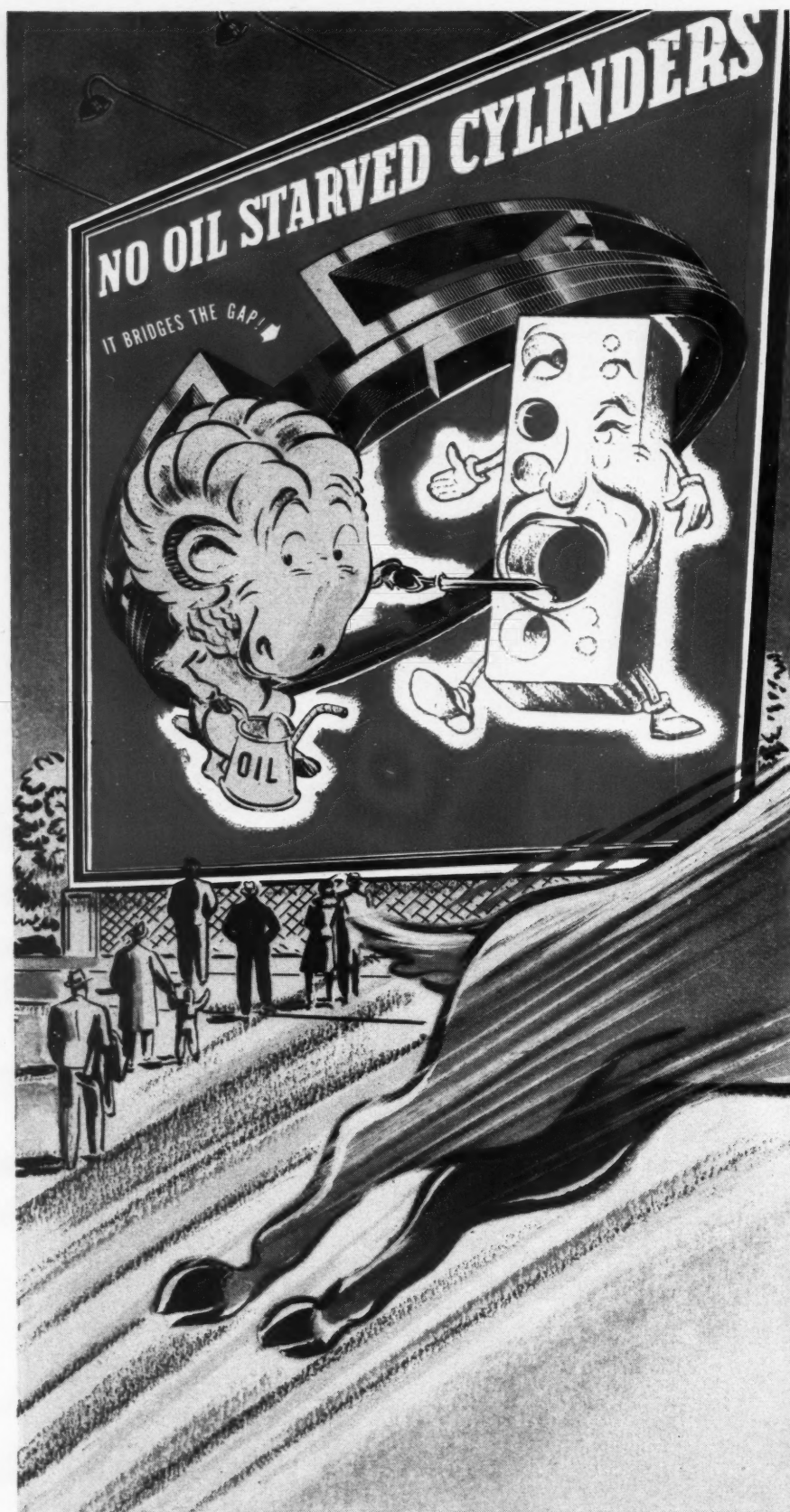


the same bearing that competent engineers choose for the majority of original installations.



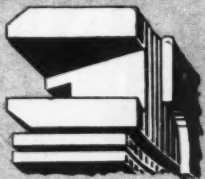
Authorized replacement bearing service wherever you see this sign. Authentic records—complete stocks—sudden service.

NEW DEPARTURE
THE FORGED STEEL BEARING

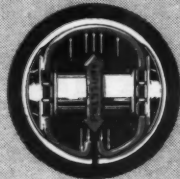


RAMCO DOUBLE LIFE PRINCIPLE

insures a cushion of cast-iron on cylinder wall... the inner ring spring tension is on the cast-iron segment... not the steel!



RAMCO PISTON EXPANDERS



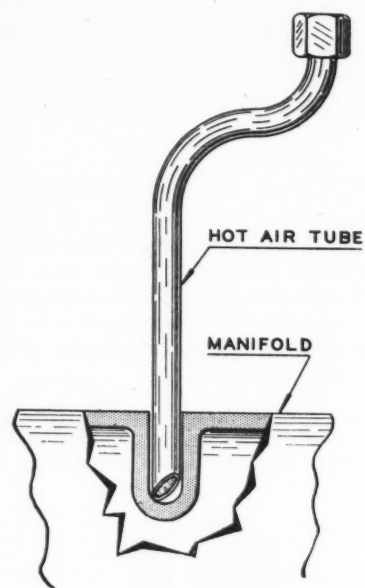
exert pressure only against the thrust sides... the only sides that need expansion! For all pistons including Ford Steel and Chevrolet cast-iron pistons.

Service

FROM THE

On Studebaker Chokes

In some cases complaints of insufficient heat for climatic control on 1941 Studebaker Champions have been caused by heat tube being pushed clear to the bottom of the pocket in the exhaust manifold. Remedy is to cut off heat tube at angle as shown in illustration which will prevent bottoming of tube. *Information through courtesy of Carter Carburetor Corp.*



Draining Underseat Heaters

The Pontiac factory has called its dealers' attention to the fact that the underseat heater cannot be drained thoroughly by simply opening the radiator and motor drain cocks.

Therefore, when it is desired to drain the cooling system with the intention of allowing the car to stand idle during freezing weather, special attention should be given the underseat heater to prevent damage to the core. To effectively drain the heater it is necessary to disconnect the inlet and outlet hose at the heater and blow the water out with an air hose.

From Body Bolt Anchorage

The inner bolts at the front body bolt anchorage have been purposely omitted on the Pontiac Special Six bodies. The outer bolts provide suffi-

Hints

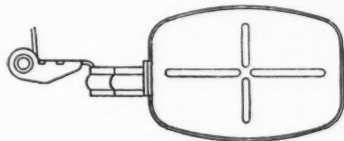
FACTORIES

cient anchorage and no attempt should be made in service to install the inner body bolts, as difficulty will be experienced in applying the nuts to these bolts and snapping noises or squeaks may result.

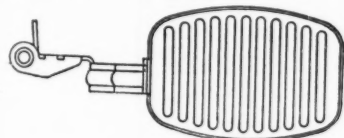
Change in Float Level

Buick 1941—All Models

Original specifications for the 1941 Buick show a 9/64 in. float level setting for all models. This setting is satisfactory only on floats with cross-rib reinforcing as illustrated below:



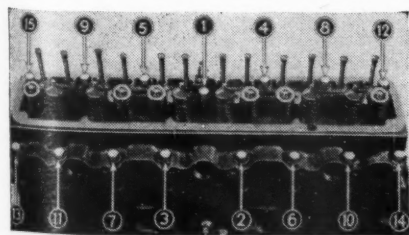
Floats with 11 vertical-rib reinforcing, as illustrated below, should have 3/16 in. float setting.



All carburetors produced after Nov. 1, 1940, have the 3/16 in. float setting. These can be identified by the letters L. O. on the brass inspection tag —“L” for November, “O” for 1940—“M” for December, etc. See cut. New 3/16 in. gage, part No. T109-162 is ready for shipment. Price 25 cents. *Information through courtesy of Carter Carburetor Corp.*



Tightening Cylinder Head



When tightening the cylinder head bolts of the 1941 Chevrolet, it is important that they be tightened in the order shown in the accompanying illustration.



In Spiro-Seal, Ramco engineering introduces a new advance in cylinder wall lubrication . . . a unique alternating wall pressure action which is greater on the down-stroke when such pressure is required for oil control . . . and less on the up-stroke when lower pressures are desirable for better lubrication.

Other Ramco 10-Up features which contribute to adequate lubrication are: 1. Lowest unit pressure of any leading ring. 2. Jumbo oil slots. 3. Double Life Principle. These are some of the reasons why Ramco 10-Up can be guaranteed to control oil in worn and tapered cylinders for 10,000 Miles . . . and is actually delivering many times this mileage for hundreds of thousands of car owners and fleet operators. Next time . . . say Ramco 10-Up.

Ramsey Accessories Mfg. Corp., 3706 Forest Park Blvd., St. Louis, Mo. *Canadian Address:* 144 Front St., W., Toronto, Ontario.

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Shop Kinks



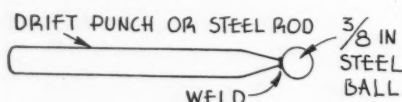
Here's your chance to pick up a little cigarette money. We'll pay three bucks (\$3.00) for every Shop Kink accepted and printed. So send 'em in to us—some short cut you use in doing a job easier and quicker than the other fellow—some special tool you made when you couldn't buy one to do the job—and we'll do the rest.

Here are some that were accepted this month:

PUNCHING BOLT HOLES

IN GASKETS

Punching bolt holes in home-made gaskets is always a tough job—many times you tear the gasket and have to make it over again.



I made a punch to do this job, and it really works swell. Take a piece of steel rod, or an old drift punch. Braze a $\frac{3}{8}$ in. steel ball on the end, and that's all there is to it. Set the punch on the gasket, directly over the bolt hole, and hit it a light tap with a hammer, and it punches the gasket out just the size of the bolt hole.—*Archie D. Thompson, Box 186, Moline, Iowa.*

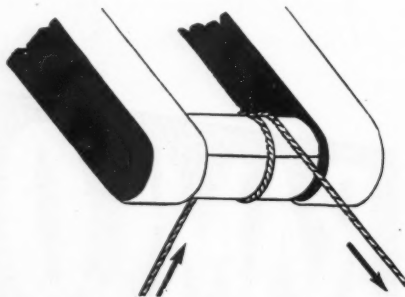
DRESSING THE

BEARING JOURNAL

When an engine burns out a rod bearing, the crankshaft journal is usually scratched—sometimes it is scored so badly that the shaft has to be replaced, but sometimes it is just scratched slightly—not bad enough to justify replacing the shaft, but still bad enough so that a new bearing

would not stand up if installed on the journal.

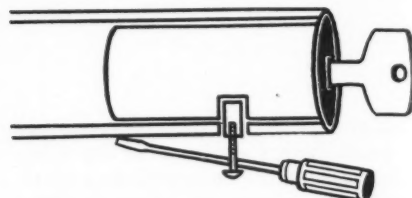
For those cases I have a method of dressing off the journal without removing the shaft from the engine. I use a little fine valve grinding compound on the inside of an old bearing insert. Install the insert on the shaft and take one turn around the insert with a strong cord, leaving the ends free. Then hold one end of the cord in each hand and pull alternately so that the bearing insert is turned around on the journal. Turn the shaft occasionally so that the pressure won't be always in the same spot. I have found that this will smooth up the



journal without making it out-of-round, so that the new bearing will deliver good service. *C. C. Winset, Arlington, Neb.*

REMOVING LOCK CYLINDER

It is sometimes quite hard to remove the ignition lock cylinder as used on the Ford car. I have found that the best and quickest way is to drill a small hole in the lock cylinder retaining pin, and then screw in a steel self-tapping screw. Turn the screw in far enough to get a firm bite, and

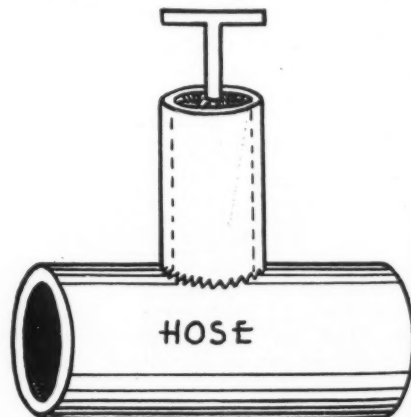


then pry under the head of the screw with a screwdriver. This will draw the retaining pin out of the lock cylinder and housing, so the lock cylinder can be removed. *Wallace Henshaw, Jr., Ferguson Motor Co., Sanderson, Tex.*

HOLE CUTTER

It is always a mean job to cut holes in radiator hose connections to plug in a hot-water heater line if you don't have a regular hole-cutter. So I made a cutter.

I used a shackle bushing from a Ford V-8 spring, cut slots at an angle



in one end with a hack saw, and then sharpened that end to make it like a sharp knife with saw teeth. Then I welded a small "T" handle on the other end.

All you have to do is push it against the hose and twist it, and it cuts a hole quickly. *Orman Bofamy, Dakota Ave., Wahpeton, N. D.*

HOLDS UNIVERSAL JOINT

To prevent Spicer type universal joints from falling apart while removing them from the car, use a piston ring to hold the needle bearing caps in place on the spider. Break off a portion of the ring so that you will be able to get it over the joint and still have a slight tension. Snap it over the bearing caps before disconnecting the joint from the companion flange. *William C. Acker, 619 Eighth Ave., San Francisco, Cal.*

Mechanical Specifications

These Specifications Are Brought Up-to-Date Each Month by the Car Manufacturers and Supersede All Others Previously Published

MAKE AND MODEL	Lowest priced 4-D. Sed. (Delvd.)	Wheelbase (In.)	Tire Size (In.)	No. of Cylinders, Bore and Stroke	ENGINE																	CHASSIS					
					Taxable Hp.	Piston Displacement (Cu. In.)	Maximum Brake Hp. at Specified R.P.M.	Compression Ratio (to-1)	Displacement Factor †	Cylinder Head Material	Camshaft Drive Make	Piston Material	Oil Cleaner Make	Air Cleaner Make	Carburetor Make	Muffler Make	Electrical System Make	Battery Make	Type and Make	Universal Joint Type and Make	Rear Axle Type and Make	Rear Axle Ratio	Front Spring Suspension				
Bantam.....65	449	75	4.00/15	4-2.26x3.12	8.2	50.14	22-3800	7.40	.....	CI	Own	Al	None	AC	Z	Mc	AL	AL	P-Ro	UP	1/2 Spi	5.25	Tr			
Buick.....41-40	1052	121	6.50/16	8-3 3/4 x 4 1/8	30.6	248.0	115-3500	6.50	36.4	CI	LB	Al	AC	AC	S-C	Hay	DR	DR	P-Obi	Mp-S-S	1/2 Own	4.40	IC				
Buick.....41-50	1185	121	6.50/16	8-3 3/4 x 4 1/8	30.6	248.0	125-3800	7.00	33.6	CI	LB	Al	AC	AC	S-C	Hay	DR	DR	P-Obi	Mp-S-S	1/2 Own	4.10	IC				
Buick.....41-60	1288	126	7.00/15	8-3 3/4 x 4 1/8	37.8	320.2	165-3800	7.00	39.0	CI	LB	Al	AC	AC	S-C	Hay	DR	DR	P-Obi	Mp-S	1/2 Own	3.90	IC				
Buick.....41-70	1364	126	7.00/15	8-3 3/4 x 4 1/8	37.8	320.2	165-3800	7.00	39.1	CI	LB	Al	AC	AC	S-C	Hay	DR	DR	P-Obi	Mp-S	1/2 Own	3.90	IC				
Buick.....41-90	2155	139	7.50/16	8-3 3/4 x 4 1/8	37.8	320.2	165-3800	7.00	.....	CI	LB	Al	AC	AC	S-C	Hay	DR	DR	P-Obi	Mp-S	1/2 Own	4.18	IC			
Cadillac V8.....61,62,63,60S	1445	126	7.00/15	8-3 3/4 x 4 1/2	39.2	346.0	150-3400	7.25	.....	CI	LB	Al	None	AC	S-C	Wal	DR	DR	P-Long	Nb-Mec	1/2 Own	3.77	IC			
Cadillac V8.....67, 75	2595	139-136	7.50/16	8-3 3/4 x 4 1/2	39.2	346.0	150-3400	7.25	.....	CI	LB	Al	None	AC	S-C	Wal	DR	DR	P-Long	Nb-Mec	1/2 Own	4.27	IC			
Chevrolet M.DL & Sp.DL	795	116	6.00/16	6-3 1/2 x 3 3/4	29.4	216.5	90-3300	6.50	35.2	CI	Dia	CI	None	AC	Car	Var	DR	DR	P-Own	Nb-Own	1/2 Own	4.11	IC				
Chrysler.....C-28	1051	121 1/2	6.25/16	6-3 3/4 x 4 1/2	27.3	241.5	112-3600	6.80	35.1	CI°	Mor	Al	Pur	AC	Car	.....	AL	Wil	P-B&B	rb	1/2	3.90	IC			
Chrysler.....C-30N, C-30K	1278	127 1/2	7.00/15	8-3 1/4 x 4 1/8	33.8	323.5	137-3400	6.80	41.5	CI°	M-W	Al	Pur	AC	Str	.....	AL	Wil	P-B&B	rb	1/2	3.91	IC			
Chrysler.....C-33	2595	145 1/2	7.50/15	8-3 1/4 x 4 1/8	33.8	323.5	140-3400	6.80	.....	Al	M-W	Al	Pur	AC	Str	.....	AL	Wil	P-B&B	rb	1/2	4.55	IC		
Crosley.....CB-41	366	80	4.25/12	2-3x2 1/2	7.2	35.3	12-4000	5.60	.....	CI	Wau	CI	None	AC	Til	Own	AL	AL	P-Ro	Mp-S	1/2 Spi	5.14	C			
De Soto-DeL. & Cust..S-8	995	121 1/2	6.25/16	6-3 3/4 x 4 1/4	27.3	228.1	105-3600	6.80	35.5	CI°	Mor	Al	Pur	AC	Car	.....	AL	Wil	P-B&B	rb	1/2	4.10	IC			
Dodge-DeL. & Cust..D-19	920	119 1/2	6.00/16	6-3 1/4 x 4 3/8	25.3	217.8	91-3800	6.50	.....	CI	Mor	Al	Pur	AC	Str	.....	AL	AL	P-B&B	bt	1/2	4.30	IC		
Ford-Spec., DL, SDL 85	740 1/2	114	6.00/16	8-3.062x3.75	30.0	221.0	85-3800	6.15	.....	CI	Dia	CS	.....	Own	Own	Own	Own	Own	P-Long	Own	1/4 Own	3.78	Tr		
Hudson-DeL. & Tr. 6. 10	811	116	(d)	6-3x4 1/8	21.6	175.0	92-4000	7.25	34.8	CI	Dia	Al	None	AC	Car	Old	AL	Na	P-Own	NB-Spi	1/2 Own	4.55	IC				
Hud.-Sup. & Com. 6. 11,12	952	121	(f)	6-3x5	21.6	212.0	102-4000	6.50	35.4	CI	Dia	Al	None	Un	Car	Old	AL	Na	P-Own	NB-Spi	1/2 Own	4.11	IC				
Hudson-Com'dore 8. 14	1095	121	6.25/16	8-3x4 1/2	28.8	254.0	128-4200	6.50	39.6	CI	Dia	Al	None	Un	Car	Old	AL	Na	P-Own	NB-Spi	1/2 Own	4.11	IC				
Hudson-Comm. Cus. 8. 17	1278	128	6.50/16	8-3x4 1/2	28.8	254.0	128-4200	6.50	.....	CI	Dia	Al	None	Un	Car	Old	AL	Na	P-Own	NB-Spi	1/2 Own	4.11	IC			
Lincoln-Zeph. & Cont. V-12	1450 1/2	125	7.00/16	12-2.875x3.75	39.6	292.0	120-3500	7.00	.....	CI	Dia	CS	.....	Own	Own	Own	Own	Own	P-Long	Own	1/4 Own	4.44	Tr		
Lincoln-Custom.....V-12	2550 1/2	138	7.00/16	12-2.875x3.75	39.6	292.0	120-3500	7.00	.....	CI	Dia	CS	.....	Own	Own	Own	Own	Own	P-Long	Own	1/4 Own	4.44	Tr		
Mercury.....95	960 1/2	118	6.50/16	8-3.187x3.75	32.5	239.0	95-3600	6.15	.....	CI	Dia	CS	.....	Own	Own	Own	Own	Own	P-Long	Own	1/4 Own	3.54	Tr		
Nash-Amb. 600.....4140	780	112	5.50/16	6-3 1/2 x 3 3/4	23.4	172.6	75-3600	6.87	33.4	CI	W-D	Als	None	AC	Car	Wal	DR	AL	P-B&B	m-Mec	1/2 Own	4.11	IC				
Nash-Amb. 6.....4160	930	121	6.25/16	6-3 3/4 x 4 3/8	27.3	234.8	105-3400	6.30	35.6	CI	W-D	Als	Pur	AC	Car	Wal	AL	AL	P-B&B	m-Mec	1/2 Own	4.10	IC				
Nash-Amb. 8.....4180	1050	121	6.50/16	8-3 1/4 x 4 1/4	31.2	260.8	115-3400	6.30	38.2	CI	W-D	Als	Pur	AC	Car	Wal	AL	AL	P-B&B	m-Mec	1/2 Own	4.10	IC				
Oldsmobile.....Special 6	945	119	6.00/16	6-3 1/2 x 4 1/8	29.4	238.0	100-3400	6.20	37.7	CI	Whit	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	1/2 Own	4.10	IC				
Oldsmobile.....Dynamic 6	1010	125	6.50/16	6-3 3/4 x 4 1/8	29.4	238.0	100-3400	6.20	37.2	CI	Whit	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	1/2 Own	4.30	IC				
Oldsmobile.....Custom 6	1099	125	7.00/15	6-3 3/4 x 4 1/8	29.4	238.0	100-3400	6.20	37.0	CI	Whit	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	1/2 Own	4.30	IC				
Oldsmobile.....Special 8	987	119	6.00/16	8-3 1/4 x 3 3/8	33.8	257.0	110-3600	6.30	38.4	CI	LB	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	1/2 Own	4.10	IC				
Oldsmobile.....Dynamic 8	1045	125	6.50/16	8-3 1/4 x 3 3/8	33.8	257.0	110-3600	6.30	39.0	CI	LB	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	1/2 Own	4.30	IC				
Oldsmobile.....Custom 8	1135	125	7.00/15	8-3 1/4 x 3 3/8	33.8	257.0	110-3600	6.30	39.0	CI	LB	Al	None	AC	Car	Var	DR	DR	P-B&B	m-Mec	1/2 Own	4.30	IC				
Packard-110.....1900	1056	122	6.50/15	6-3 1/2 x 4 1/4	29.4	245.0	100-3600	6.39	.....	CI	Mor	Als	.....	AC	Str	.....	A-D	Wil	P-Long	UP	1/2 Own	4.30	IC	
Packard-120.....1901	1261	127	7.00/15	8-3 1/4 x 4 1/4	33.8	282.0	120-3600	6.41	40.6	CI	Mor	Als	.....	AC	Str	Wal	AL	AL	P-Long	rb-Mec	1/2 Own	4.09	IC			
Packard-160.....1903, 4, 5	1750	127-38-48	7.00/16	8-3 1/4 x 4 3/8	39.2	356.0	160-3600	6.45	43.8	CI	Mor	Als	Pur	AC	Str	.....	AL	AL	P-Long	rb-Mec	1/2 Own	(g)	IC			
Packard-180.....1906, 7, 8	2587	127-38-48	7.00/16	8-3 1/4 x 4 3/8	39.2	356.0	160-3600	6.45	43.8	CI	Mor	Als	Pur	AC	Str	.....	AL	AL	P-Long	rb-Mec	1/2 Own	(g)	IC			
Plymouth.....P-11	780	117	6.00/16	6-3 1/2 x 4 3/8	23.4	201.3	87-3800	6.70	35.1	CI	Mor	Al	Pur	AC	Car	.....	AL	AL	P-B&B	bt	1/2 Own	4.10	IC			
Plymouth-Spec. DeL.P-12	840	117	6.00/16	6-3 1/2 x 4 3/8	23.4	201.3	87-3800	6.70	36.1	CI°	Mor	Al	Pur	AC	Car	.....	AL	AL	P-B&B	bt	1/2 Own	4.30	IC			
Pontiac-DeL. 6.....41-25	921	119	6.00/16	6-3 1/2 x 4	30.4	239.2	90-3200	6.50	.....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	1/2 Own	4.10	IC			
Pontiac-Stream. 6.....41-26	980	122	6.50/16	6-3 1/2 x 4	30.4	239.2	90-3200	6.50	.....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	1/2 Own	4.30	IC			
Pontiac-Custom 6.....41-24	1052	122	6.50/16	6-3 1/2 x 4	30.4	239.2	90-3200	6.50	.....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	1/2 Own	4.30	IC			
Pontiac-DeL. 8.....41-27	946	119	6.00/16	8-3 1/4 x 3 3/8	33.8	248.9	103-3500	6.50	.....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	1/2 Own	4.10	IC			
Pontiac-Stream. 8.....41-28	1005	122	6.50/16	8-3 1/4 x 3 3/8	33.8	248.9	103-3500	6.50	.....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	1/2 Own	4.30	IC			
Pontiac-Custom 8.....41-29	1077	122	6.50/16	8-3 1/4 x 3 3/8	33.8	248.9	103-3500	6.50	.....	CI	Mor	CN	Own	AC	Car	Var	DR	DR	P-Inl	rb-SM	1/2 Own	4.30	IC			
Studebaker-Champ. 6. 3G	770	110	5.50/16	6-3x4	21.6	169.6	80-4000	6.50	39.2	CI	Dia	Al	None	AC	Car	Wal	AL	Wil	P-B&B	NB-Spi	1/2 Spi	4.56	IT				
Studebaker-Com. 6.....11A	985	119	6.25/16	6-3 1/2 x 4 3/8	26.3	226.2	94-3600	6.50	40.2	CI	Dia	Al	Fram	AC	Str	Wal	AL	Wil	P-B&B	NB-Spi	1/2 Spi	4.55	IT				
Studebaker-Pres. 8.....7C	1115	124 1/2	7.00/16	8-3 1/2 x 4 1/4	30.0	250.4	117-4000	6.50	39.0	CI	Dia	Al	Fram	AC	Str	Wal	AL	Wil	P-Inl	NB-Spi	1/2 Spi	4.55	IT				
Willis-American.....441	705	104	5.50/16	4-3 1/2 x 4 3/8	15.6	134.2	63-3900	6.48	30.8	CI	LB	Al	None	AC	Car	Mc	AL	AL	P-At	m-UP	1/2 Own	4.44	1/2 E				

ABBREVIATIONS:

1/2-Semi-floating
3/4-Three-quarter floating
1/2-E-Semi-elliptic
*Aluminum optional
†-Exclusive of Federal taxes.
(d)-De Luxe, 6.00/16; Traveler, 5.50/16
(f)-Model 11-6.00/16; Model 12-6.25/16
(g)-Models 1903-6, 3.92; Models 1904-7, 4.09; Models 1905-8, 4.36

A-D-Electric Auto-Lite Co. and Delco-Remy Division
AC-AC Spark Plug Co.
Al-Aluminum
AL-Electric Auto-Lite Co.
Als-Aluminum with struts
At-Atwood
B&B-Borg & Beck Division
bt-Ball and trunnion type
C-Conventional
Car-Carter Carburetor Corp.
CC-Conventional coil
CI-Cast iron
CN-Chrome nickel
CS-Cast steel
Dia-Continental Diamond Fibre Co.
DR-Delco-Remy Division
Hay-Hayes Industries, Inc.
IC-Independent coil spring
Inl-Inland with Long disc
IT-Independent transverse
LB-Link Belt Co.
Long-Long Mfg. Div.
m-Metal with anti-friction bearings.
Mc-MacKenzie Muffler Co.
Mec-Mechanics Universal Joint Division
Mor-Morse Chain Co.

Mp-Metal with plain bearings
M-W-Morse or Whitney
Na-National Battery Co.
Nb-Needle bearing
Obi-Own clutch, Borg & Beck or Long disc
Old-Oldberg Mfg. Co.
P-Single plate clutch
Pur-Purulator Products, Inc.
rb-Roller bearing
Ro-Rockford Drilling Machine Div.
S-Saginaw Steering Gear Div.
S-C-Stromberg and Carter
SM-Saginaw and Mechanics
Spi-Spicer Mfg. Corp.

S-S-Saginaw and Spicer
Str-Stromberg (Bendix Products Div.)
Til-Tillotson Mfg. Co.
Tr-Transverse
Un-United Air Cleaner Div.
UP-Universal Products Co.
Var-Various
Wal-Walker Mfg. Co.
Wau-Waukesha Motor Co.
W-D-Whitney and Diamond Chain Co.
Whit-Whitney Mfg. Co.
Wil-Willard Storage Battery Co.
Z-Zenith Carburetor Div.

Tune-Up Specifications

These Specifications Are Brought Up-to-Date Each Month by the
Car Manufacturers and Supersede All Others Previously Published

MAKE AND MODEL	Compression Pressure at Cranking Speed (Lbs.)	Spark Plugs Make and Type	RINGS		VALVES								IGNITION						Rods Removed From	Capacity Crankcase (Qts.)	Dry Capacity Cooling System	FRONT AXLE				
			No. and Width Compression	No. and Width Oil	Inlet Seat Angle (Degrees)	Exhaust Seat Angle (Degrees)	Stem Diameter (Ins.)	Operating Tappet Clearance		Inlet Valve Opens Before or After T. C.	Inlet Tappet Clearance for Valve Timing	No. of Degrees	No. of Flywheel Teeth	Breaker Points Gap (Ins.)	Cam Angles (Degrees)	Spark Plug Gap (Ins.)	Spark Occurs °TC	No. of Flyw. Teeth Spark Occurs TC				Timing Marks Located	Caster (Degrees)	Camber (Degrees)	Toe-In (Inches)	King Pin Inclination (Degrees)
								Inlet	Exhaust																	
Bantam.....65	135	Ch-H10	2-3/8	1-3/8	45	45	.279	.011H	.012H	.011	19B	4 1/2B	.022	46	.025	4B	1B	None	A	3	5 1/2	15	1°-15'	1/8	1 1/2	
Buick.....41-40	142x	AC-104	2-3/8	2-1/8	45	45	.372	.015H	.015H	++	13B	5 1/2B	.015	31	.025	2B	1B	None	A	8	13	3 1/2	N1-1-1 1/2	0-1/8	3 1/2	
Buick.....41-50	148x	AC-104	2-3/8	2-1/8	45	45	.372	.015H	.015H	++	13B	5 1/2B	.015	31	.025	4B	1B	None	A	8	13	3 1/2	N1-1-1 1/2	0-1/8	3 1/2	
Buick.....41-60	151x	AC-104	2-3/8	2-1/8	45	45	.372	.015H	.015H	++	14B	6B	.015	31	.025	6B	2 1/2B	None	A	10	16 1/2	3 1/2	N1-1-1 1/2	0-1/8	3 1/2	
Buick.....41-70	151x	AC-104	2-3/8	2-1/8	45	45	.372	.015H	.015H	++	14B	6B	.015	31	.025	6B	2 1/2B	None	A	10	16 1/2	3 1/2	N1-1-1 1/2	0-1/8	3 1/2	
Buick.....41-90	151x	AC-104	2-3/8	2-1/8	45	45	.372	.015H	.015H	++	14B	6B	.015	31	.025	6B	2 1/2B	None	A	10	18	3 1/2	N1-1-1 1/2	0-1/8	4 3/4	
Cadillac V8...61,62,63,60S	182x	AC-104	2-(c)	2-3/8	45	45	.341	AA	AA	AA	TC	TC	.0125	31	.025	5B	2B	TD	A	7	25	-1 1/2-N2 1/2	0-1/8	5°-51'		
Cadillac V8...67,75	182x	AC-104	2-(c)	2-3/8	45	45	.341	AA	AA	AA	TC	TC	.0125	31	.025	5B	2B	TD	A	7	25	-1 1/2-N2 1/2	0-1/8	5°-51'		
Chevrolet Sp.DL & M.DL	AC-104	AC-104	2-3/8	1-3/8	30	30	.340	.006H	.013H	.006	3B	1B	.018	39	.040	5B	2B	Fly	A	5 1/2	14	0-1 1/2	N1 1/4=1 1/2	0-1/8	4°-45'	
Chrysler.....C-28	145x	AL-A7	2-3/8	2-3/8	45	45	.340	.008H	.010H	.014	12B	4 1/2B	.020	34 1/2	.025	TC	TC	VD	A	5	18	N1-1-1	0-1 1/4	0-1/8	4 3/4-6	
Chrysler.....C-30N, C-30K	155x	AL-A7	2-3/8	2-3/8	45	45	.340	.008H	.010H	.011	6B	2 1/2B	.018	27-30 1/2	.025	TC	TC	VD	A	6	24	N1-1-1	0-1 1/4	0-1/8	4 3/4-6	
Chrysler.....C-33	155x	AL-AL7	2-3/8	2-3/8	45	45	.340	.008H	.010H	.011	6B	2 1/2B	.018	27-30 1/2	.025	3B	1B	VD	A	6	24	N1-1-1	0-1 1/4	0-1/8	4 3/4-6	
Crosley.....CB-41	80	AL-A5	2-3/8	1-3/8	45	45	.311	.006C	.008C	....	20B	5B	.020	46	.025	TC	TC	Fly	A	3	....	6 1/2-11	2	1/8	6 1/2
De Soto-DeL. & Cust. S-8	150x	AL-A7	2-3/8	2-3/8	45	45	.340	.008H	.010H	.014	12B	2 1/2B	.020	34 1/2	.025	TC	TC	VD	A	5	18	N1-1-1	0-1 1/4	0-1/8	4 3/4-6	
Dodge-DeL. & Cust. D-19	142x	AL-A7	2-(c)	2-3/8	45	45	.340	.008H	.010H	.014	9B	3 1/2B	.020	34 1/2	.025	TC	TC	VD	A	5	15	N1-1-1	0-1 1/4	0-1/8	4 3/4-6	
Ford-Spec., DL, SDESS	100	Ch-H10	2-(b)	1-(f)	45	45	(k)	.011C	.011C	....	TC	TC	.015	....	.025	4B	1 1/2B	Dist	A	5	23 3/4	4 1/2-9	1/4-1	1/8	8
Hudson-DeL. & Tr. 6...10	125x	Ch-J9	2-3/8	2-(d)	45	45	.341	.006H	.008H	....	10 1/2B	4B	.020	34	.032	1 1/2B	2 1/2B	Fly	A	6	13	0-1 1/4	1 1/2=1 1/4	3/8=3/8	3°-36'
Hud.-Sup. & Com. 6...11,12	120x	Ch-J9	2-3/8	2-(d)	45	45	.341	.006H	.008H	....	10 1/2B	4B	.020	34	.032	1 1/2B	2 1/2B	Fly	A	6	13	0-1 1/4	1 1/2=1 1/4	3/8=3/8	3°-36'
Hudson-Com'dore 8...14	119x	Ch-J9	2-3/8	2-(d)	45	45	.343	.006H	.008H	....	10 1/2B	4B	.017	30 1/2	.032	TC	1B	Fly	A	9	18	0-1 1/4	1 1/2=1 1/4	3/8=3/8	3°-36'
Hudson-Comm. Cus. 8...17	119x	Ch-J9	2-3/8	2-(d)	45	45	.343	.006H	.008H	....	10 1/2B	4B	.017	30 1/2	.032	TC	1B	Fly	A	9	18	0-1 1/4	1 1/2=1 1/4	3/8=3/8	3°-36'
Lincoln-Zeph. & Cont. V-12	Ch-H10	Ch-H10	2-(g)	1-(h)	45	45	.311	.013C	.013C	....	10 1/2B	3 1/2B	.015	....	.029	4B	1 1/2B	Dist	A	5	22	3-5	1/4-3/4	1/8	3 3/4-4 3/4
Lincoln-Custom.....V-12	Ch-H10	Ch-H10	2-(g)	1-(h)	45	45	.311	.013C	.013C	....	10 1/2B	3 1/2B	.015	....	.029	4B	1 1/2B	Dist	A	5	22	3-5	1/4-3/4	1/8	3 3/4-4 3/4
Mercury.....95	100	Ch-H10	2-(b)	1-(f)	45	45	(k)	.011C	.011C	....	TC	TC	.015	....	.025	4B	1 1/2B	Dist	A	5	23 3/4	4 1/2-9	1/4-1	1/8	8
Nash-Amb. 600.....4140	120	AL-AN7	2-3/8	1-3/8	45	45	.341	.015	.015	.019	6B	2B	.018	35	.025	TC	TC	VD	A	5	14	0	0-1 1/4	0-1/8	5 1/2	
Nash-Amb. 6.....4160	125	AC-	2-3/8	2-3/8	45	45	.372	.015	.015	.015	24B	6B	.020	35	.023	....	VD	A	6	17	0-N 1/2	1/4-3/4	3/8-3/8	4 1/2	
Nash-Amb. 8.....4180	110	AC-	2-3/8	2-(e)	45	45	.372	.015	.015	.015	19B	6B	.020	28	.023	9B	2 1/2B	VD	A	7	16	0-N 1/2	1/4-3/4	3/8-3/8	4 1/2	
Oldsmobile.....Special 6	115	AC-44	2-3/8	2-3/8	30	45	.342	.008H	.011H	.012	5B	2B	.020	35	.040	TC	TC	Fly	A	5	18	0-N 3/4	N1 1/4-3/4	1/8-1/8	4°-51'	
Oldsmobile.....Dynamic 6	115	AC-44	2-3/8	2-3/8	30	45	.342	.008H	.011H	.012	5B	2B	.020	35	.040	TC	TC	Fly	A	5	18	0-N 3/4	N1 1/4-3/4	1/8-1/8	4°-51'	
Oldsmobile.....Custom 6	115	AC-44	2-3/8	2-3/8	30	45	.342	.008H	.011H	.012	5B	2B	.020	35	.040	TC	TC	Fly	A	5	18	0-N 3/4	N1 1/4-3/4	1/8-1/8	4°-51'	
Oldsmobile.....Special 8	107	AC-44	2-3/8	2-3/8	30	45	.342	.008H	.011H	.012	TC	TC	.015	31	.030	2B	3/4B	Fly	A	6	22	0-N 3/4	N1 1/4-3/4	1/8-1/8	4°-51'	
Oldsmobile.....Dynamic 8	107	AC-44	2-3/8	2-3/8	30	45	.342	.008H	.011H	.012	TC	TC	.015	31	.030	2B	3/4B	Fly	A	6	22	0-N 3/4	N1 1/4-3/4	1/8-1/8	4°-51'	
Oldsmobile.....Custom 8	107	AC-44	2-3/8	2-3/8	30	45	.342	.008H	.011H	.012	TC	TC	.015	31	.030	2B	3/4B	Fly	A	6	22	0-N 3/4	N1 1/4-3/4	1/8-1/8	4°-51'	
Packard-110.....1900	(a)	2-(m)	1-1/8	30	45	.339	.007H	.010H	.012	1B	1 1/2B	.020	35	.028	6B	2 1/2B	VD	A	5	15	1 1/2=1 1/2	1 1/2=1 1/2	0-1 1/4	0-1/8	2 1/2	
Packard-120.....1901	(a)	2-(n)	1-1/8	30	45	.339	.007H	.010H	.012	1B	1 1/2B	.015	27	.028	7B	2 1/2B	VD	A	6	17	1 1/2=1 1/2	1 1/2=1 1/2	0-1 1/4	0-1/8	2 1/2	
Packard-180.....1903, 4, 5	(a)	2-(m)	1-1/8	30	45	.339	aa	11	aa	4B	1 1/2B	.015	27	.028	5B	2B	VD	A	7	20	N 3/4=1 1/2	1 1/2=1 1/2	0-1 1/4	0-1/8	2 1/2	
Packard-180.....1906, 7, 8	(a)	2-(m)	1-1/8	30	45	.339	aa	aa	aa	4B	1 1/2B	.015	27	.028	5B	2B	VD	A	7	20	N 3/4=1 1/2	1 1/2=1 1/2	0-1 1/4	0-1/8	2 1/2	
Plymouth.....P-11	AL-A7	2-(c)	2-3/8	45	45	.340	.008H	.010H	.014	9B	3 1/2B	.020	34 1/2	.025	TC	TC	VD	A	5	14	N1-1-1	0-3/4	0-1/8	4 3/4-6		
Plymouth-Spec. DeL.P-12	AL-A7	2-(c)	2-3/8	45	45	.340	.008H	.010H	.014	9B	3 1/2B	.020	34 1/2	.025	TC	TC	VD	A	5	14	N1-1-1	0-3/4	0-1/8	4 3/4-6		
Pontiac-DeL. 6.....41-25	155x	AC-45	2-3/8	1-3/8	30	45	.312	.012H	.012H	.015	5B	2B	.020	37	.025	4B	1 1/2B	Fly	A	6	18	N1 1/4-N1	0	0-1/8	4 3/4	
Pontiac-Stream. 6.....41-26	155x	AC-45	2-3/8	1-3/8	30	45	.312	.012H	.012H	.015	5B	2B	.020	37	.025	4B	1 1/2B	Fly	A	6	18	N1 1/4-N1	0	0-1/8	4 3/4	
Pontiac-Custom 6.....41-24	155x	AC-45	2-3/8	1-3/8	30	45	.312	.012H	.012H	.015	5B	2B	.020	37	.025	4B	1 1/2B	Fly	A	6	18	N1 1/4-N1	0	0-1/8	4 3/4	
Pontiac-DeL. 8.....41-27	155x	AC-45	2-3/8	1-3/8	30	45	.312	.012H	.012H	.015	5B	2B	.015	31	.025	4B	1 1/2B	Fly	A	6	19 1/2	N1 1/2-N1	0	0-1/8	4 3/4	
Pontiac-Stream. 8.....41-28	155x	AC-45	2-3/8	1-3/8	30	45	.312	.012H	.012H	.015	5B	2B	.015	31	.025	4B	1 1/2B	Fly	A	6	19 1/2	N1 1/2-N1	0	0-1/8	4 3/4	
Pontiac-Custom 8.....41-29	155x	AC-45	2-3/8	1-3/8	30	45	.312	.012H	.012H	.015	5B	2B	.015	31	.025	4B	1 1/2B	Fly	A	6	19 1/2	N1 1/2-N1	0	0-1/8	4 3/4	
Studebaker-Champ. 6...3G	105	Ch-J8	2-(c)	1-3/8	45	45	.312	.016C	.016C	.020	15B	5B	.020	35	.025	1B	2B	Fly	A	5	10 1/2	1-2	1/4	1/8-3/8	5 1/2	
Studebaker-Com. 6...11A	105	Ch-8	2-3/8	1-3/8	45	45	.343	.016C	.016C	.020	15B	5 1/2B	.020	35	.025	2B	3/4B	VD	A	6	13	N1-1-1	1/2	1/8-3/8	5 1/2	
Studebaker-Pres. 8...7C	105	Ch-8	2-3/8	1-3/8	45	45	.343	.016C	.016C	.020	15B	5 1/2B	.020	34 1/2	.025	TC	TC	VD	A	8	15	N1-1-1	1/2	1/8-3/8	5 1/2	
Willis-American.....441	111	Ch-J9	2-3/8	1-3/8	45	45	.373	.014C	.014C	.020	9B	2 1/2B	.020	41	.030	TC	TC	Fly	A	4	11 1/4	3	2	3/8-3/8	7 1/2	

ABBREVIATIONS:

(x)—At 1000
(a)—AC-104; Champion Y-4
(b)—.0915 in. to .0920 in.
(c)—3/8; 1/2
(d)—1 1/2; 1 3/4

(e)—1 1/4; 1 1/2
(f)—.1535 in. to .1540 in.
(g)—.0930 in. to .0935 in.
(h)—.1845 in. to .1850 in.
(k)—.3095 in. to .3115 in.
(m)—1—.0932; 1—.1237

(n)—1—.0925—.0935; 1—.1235—.1240

aa—Automatic adjustment
A—Above
AA—Automatic Adjuster
AC—AC Spark Plug Co.

Motor Car Price, Weight and Body Table

Following are delivered prices at factory for cars with standard equipment and include all federal taxes with exception of Ford, Lincoln-Zephyr, Mercury and Willys. Optional equipment, state or local taxes, transportation charges and finance charges are extra.

BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight	BODY, MAKE AND MODEL	Delivered Price	Shipping Weight
BANTAM			CADILLAC (Continued)			DE SOTO			HUDSON (Continued)			OLDSMOBILE (Continued)			PONTIAC DeLuxe Six		
Mast. Coupe, 2p.	449	1271	Tour. Sedan, 7p.	2735	4630	De Luxe Coupe, 3p.	898	3134	Commodore			Dynamic Eight			Coupe.....	828	3145
Mast. Road., 2p.	449	1211	Tr. Sed. Div., 5p.	2745	4630	Sedan, 2d., 3p.	965	3224	Cust. 8-15			Club Sedan, 6p.	989	3420	Sedan Coupe...	864	3180
Pickup Truck	475	1256	Tr. Imperial, 7p.	2890	4705	Sedan, 4d., 6p.	995	3254	Coupe, 3p.	1110	3185	Sedan, 4d., 6p.	1045	3500	Sedan, 2d.	874	3190
Panel Truck	489	1331				Sedan, 7p.	1255	3629	Club Coupe, 6p.	1173	3235				Sedan, 4d.	921	3235
Conv. Coupe, 2p.	525		Series 75			Club Coupe, 5p.	985	3219				Custom Eight			Conv. Sed. Cpe.	1023	3335
Conv. Sedan, 4p.	549	1296	Bus. Sedan, 8p.	2895	4738				Commodore			Club Coupe, 3-6p	1079	3430			
Sta. Wagon, 4p.	575	1411	Tour. Sedan, 5p.	2995	4757	Custom			Cust. 8-17			Sedan, 4d, 6p.	1135	3500	Streamliner		
			Bus. Imperial, 5p.	3050	4760	Coupe, 3p.	945	3144	Sedan, 4d., 6p.	1278	3400	Conv. Cpe., 2-4p	1227	3620	Six		
			Tour. Sedan, 7p.	3140	4800	C. Clb. Cpe., 5p	1195	3494	Sedan, 4d., 6p.	3440		Conv. Phae., 6p.	1575	3790			
			Tr. Sed. Div., 5p.	3150	4810	Brougham, 6p.	1020	3264							Sedan Coupe...	923	3305
			Tr. Imperial, 7p.	3295	4880	Sedan, 4d., 6p.	1045	3269	Big Boy-18						Sedan, 4d.	980	3365
			Formal Sedan, 5p	3920	4915	Town Sedan, 6p.	1095	3329	Carryall, 8p.	3165					Sup. Sed. Cpe.	969	3320
						Club Coupe, 5p.	1035	3239	Sedan, 8p.	3155					Sup. Sed., 4d.	1026	3400
						Sedan, 7p.	1295										
						Limousine, 7p.	1370		LINCOLN-ZEPHYR			Bus. Coupe, 2p.	907	3150	Custom Six		
									Standard			Club Cpe., 2-4p.	1000	3200			
									Coupe, 3p.	1390	3560	Tr. Sed., 2d., 5p.	1024	3245	Sedan Coupe...	995	3260
									Sedan, 6p.	1450	3710	D. Clb. Cpe., 2-4p	1038	3205	Sedan, 4d.	1052	3355
									Club Coupe, 6p.	1450	3640	Tr. Sed., 4d., 5p.	1056	3250			
									Conv. Coupe, 6p	1750	3840	D. T. Sed., 2-4p.	1084	3270	DeL. Eight		
												D. T. Sed., 4d, 6p.	1116	3270	Coupe.....	853	3220
									Custom	1465	3560	Conv. Cpe., 2-4p	1175	3310	Sedan Coupe...	889	3250
									Sedan	1545	3710	D. C. Cpe., 2-4p.	1209	3315	Sedan, 2d.	899	3250
									Club Coupe.	1545	3640	Stat. Wag., 8p.	1231	3460	Sedan, 4d.	946	3285
												D. Sta. Wag., 8p	1306	3470	Conv. Sed. Cpe.	1048	3390
												One Twenty			Streamliner		
												Bus. Cpe., 2p.	1112	3385	Eight		
												Club Cpe., 2-4p.	1205	3430	Sedan Coupe...	948	3370
												Tr. Sed., 2d., 5p.	1230	3504	Sedan, 4d.	1005	3425
												Tr. Sed., 4d., 5p.	1261	3510	Sup. Sed. Cpe.	994	3385
												Conv. Cpe., 2-4p	1377	3585	Sup. Sed., 4d.	1051	3460
												Sta. Wagon, 8p.	1436	3720			
												D. Sta. Wagon, 8p	1511	3730	Custom Eight		
												D. Conv. Sedan, 5p.	1723	3725	Sedan Coupe...	1020	3325
															Sedan, 4d.	1077	3430
												Super Eight			STUDEBAKER		
												One Sixty-1903					
												Bus. Coupe, 2p.	1594	3875	Champion		
												Club Coupe, 2-4p	1709	3800	Custom		
												Tr. Sed., 4d., 5p.	1750	3865	Coupe.....	690	2355
												Conv. Cpe. 2-4p	1892	3955	Coupe, 5p	725	2375
												D. C. Cpe., 2-4p.	2067	3985	Club Sedan	730	2420
												Conv. Sedan, 5p.	2180	4140	Cruis. Sedan...	770	2450
												D. Conv. Sed., 5p	2405	4160			
															DeLuxe		
												1904			Coupe.....	720	2365
												Tr. Sed., 4d., 5p	2009	4305	Coupe, 5p	755	2385
															Club Sedan	760	2430
												1905			Cruis. Sedan...	800	2460
												Tour. Sedan, 7p.	2161	4495	DeLux-Tone		
												Limousine	2289	4570	Coupe.....	755	2385
															Coupe, 5p	760	2430
												One Eighty-1906			Club Sedan	780	2430
												Conv. Vict., 5p.	4550	4040	Cruis. Sedan...	800	2460
												1907			DeLux-Tone		
												Tr. Sed., 4d., 5p	2587	4350	Coupe.....	755	2380
												Formal Sed., 5p	3045	4380	Coupe, 5p	790	2400
												Brougham, 5p	3500	4450	Club Sedan	795	2445
												Cabriolet	4650	4075	Cruis. Sedan...	835	2475
												Sport Sedan, 5p.	4750	4490			
															Commander 6		
												1908			Custom		
												Tour. Sedan, 7p.	2724	4590	Cruis. Sedan...	985	3135
												Tr. Lim., 7p.	2868	4650	Land Cruiser...	1030	3160
												Town Car	4775	4200			
												Tr. Clb., LeB., 7p	5300	4740	DeLux-Tone		
												Tr. Lim., LeB., 7p	5550	4850	Cruis. Sedan...	1050	3155
															Land Cruiser...	1095	3180
												PLYMOUTH			President 8		
												Coupe, 2p.	685	2809	Custom		
												Sedan, 2d., 5p.	739	2859	Cruis. Sedan...	1115	3390
												Sedan, 4d., 6p.	780	2889	Land Cruiser...	1160	3420
												Sedan, 4d., 6p.	780	2889			
												Utility Sed., 2d.	739	2794	DeLux-Tone		
															Cruis. Sedan...	1180	3405
												DeLuxe			Land Cruiser...	1225	3435
												Coupe, 2p.	729	2839			
												Sedan, 2d., 5p.	779	2899	WILLYS-AMERICAN		
												Sedan, 4d., 5p.	820	2924	Coupe.....	705	2285
															Station Wagon.		
												Special DeL.					
												Coupe, 2p.	760	2859			
												Coupe, 2-4p.	805	2934			
												Sedan, 2d., 5p.	810	2934			
												Sedan, 4d., 5p.	840	2959			
												Conv. Cpe., 2-4p	970	3166			
												Sedan, 7p.	1045	3379			
												Limousine, 7p.	1120				
												Station Wagon.	995	3194			

*—Shipping weights revised to car without running boards.

AUTOMOTIVE MEN

MEMA Leaders Elected

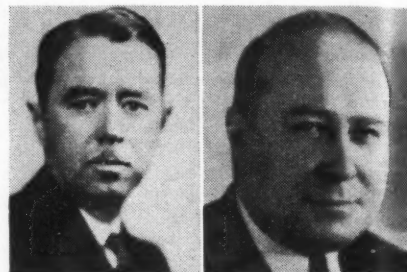
A. H. Eichholz, MEMA general manager, announces that at the meeting of the board of directors, held last month, the following were elected as officers of the Motor & Equipment Manufacturers Assn. for the year 1941: president, H. R. Kerans, The K-D Lamp Co., Cincinnati, Ohio; vice-president, R. B. Davis, Raybestos

Division Raybestos-Manhattan, Inc., Bridgeport, Conn.; secretary, E. A. Hall, The Hall Mfg. Co., Toledo, Ohio; treasurer (reelected), C. P. Brewster, K-D Mfg. Co., Lancaster, Pa.

Wilson Elected G.M. President

Alfred P. Sloan, Jr., chairman of General Motors Corp., announced that at a meeting of the board of directors

last month Charles E. Wilson, who has been acting president since William S. Knudsen retired to assist in the national defense program, was elected president of General Motors Corp.



K. B. Elliott

Geo. D. Keller

Elliott Heads Studebaker Sales

Paul G. Hoffman, president of the Studebaker Corp., announced two shifts in executives as part of the company's participation in national defense production and intensification of its passenger car and truck sales campaign. Geo. D. Keller, vice-president in charge of sales, has been appointed assistant to H. S. Vance, chairman, who is directing Studebaker's defense manufacturing program.

K. B. Elliott, vice-president of Studebaker and Hoffman's assistant for several years, was named to succeed Keller. Elliott joined Studebaker in 1928 and by successive promotions became assistant to the president in 1930. In 1936 he was elected vice-president.

Named Pedrick General Manager

Following the resignation of George L. Briggs who was executive vice-president of Wilkening Manufacturing Co., maker of Pedrick Piston Rings, David A. Cowhig has been named general manager of the company. Cowhig has been with the Pedrick organization for nearly thirteen years, most recently as assistant treasurer and comptroller. He is a graduate of the University of Pennsylvania.



D. A. Cowhig

W. A. Kirkpatrick, who has been advertising manager for the past five years, will be in direct charge of all advertising and sales promotion activities of the company.

According to F. W. Wilkening, president, the company ended its fiscal year of 1939-40 with the largest net gain in sales of Pedrick Piston Rings of any year in the past five years.

When the water goes in . . .
let the
PROFITS COME OUT!

**WARNER
LIQUID SOLDER**
A permanent repair for
leaky cooling systems
—and even cracked motor
blocks!



**WARNER
RADIATOR CLEANER**
Every cooling system
should be cleaned when
the anti-freeze comes out!



**WARNER COOLING
SYSTEM PROTECTOR**
Sell this proved product
—to replace the rust inhibitor
in the anti-freeze that is
drained out!

*Warner Cooling System Products are
Nationally Advertised in COLLIER'S...to boost
your sales in After-Anti-Freeze Service.*

You have the wide-open opportunity to make a profitable sale of cooling system service...with every radiator you service this Spring! Warner Cooling System Products have opened the way to these extra profits...and helping you to make these sales!

Plan now. Order now...for your share of the cooling system business this Spring.

FREE • ASK your supplier for the **FREE** book of proved selling plans: "Profitable Cooling System Service." Or, write to:

WARNER-PATTERSON COMPANY
920 SOUTH MICHIGAN AVENUE, CHICAGO, ILLINOIS

ENGINE SERVICE

(Continued from page 43)

disassemble the crankshaft. The shaft is made in two sections, held together by a bolt lengthwise through the connecting rod bearing journal. Hold the crankshaft by placing the front counterweight in a vise. Remove the accessory drive gear from the rear end of the shaft, and remove the rear roller bearing. Remove the cotter pin from the bolt holding the crankshaft together, and screw out the bolt. There are threads in both halves of the crankshaft, and it is necessary to screw the bolt all the way out before attempting to separate the shaft. Two special screws are required to force the shaft apart—one is screwed into the forward end of the crankshaft until the threads are engaged, and another is screwed into the rear end of the shaft. Turning in the rear screw will force the crankshaft apart. It is then possible to slide the master connecting rod off the bearing journal.

With the master connecting rod and link rods removed from the crankshaft, remove the link rod knuckle pins holding the rods to the master rod. Use a puller to remove these pins—they should not be driven out with a drift and hammer.

TRACTOR MAINTENANCE

(Continued from page 41)

move the rear half of the tractor back.

Now split the drive coupling by removing three capscrews holding the coupling together and place the front half back in position in the clutch plate. (Note: in reassembling, coupling is bolted together after unit is assembled through a hand hole in the bottom of the flywheel housing. On Model 503.103 be sure the hole in the splined end of the shaft is lined up with the bolthole in the coupling.)

Remove the capscrews and lockwashers and one nut (on housing pilot stud) holding carrier to axle housing.

Disconnect draw bar center brace from underside of carrier by taking out two capscrews.

Loosen only two capscrews, holding rear end of center brace to the draw bar.

Block up rear end of draw bar to keep rear of tractor from tipping back when the weight of the transmission and carrier is removed.

Place wood blocks under rear tires, front and rear, to hold rear of tractor steady.

With lead hammer, tap transmission and carrier to separate unit from axle housing, and insert pinch bar between rear end of carrier and the axle housing and gently pry units apart. Lower the units to the bench, as shown in Fig. 2.

Emblems

The automobile emblems which are illustrated on page 54, but which have the identification blanked out, are as follows: 1, Chrysler; 2, Durant; 3, Chevrolet; 4, Elcar; 5, Jordan.

Grey-Rock Offers a New Line in "Standard Sets"

Grey-Rock jobbers are now offering the new "Standard Sets" with full coverage on all Ford, Chevrolet and Plymouth models as well as popular Lockheed, Bendix and other makes and models.

These sets are chiefly made up of the Grey-Rock Wyrbac material. For certain Ford models, "Standard Sets" come in Grey-Rock Alloy Wire Eagle, Zinc Wire Woven and D. F. E. materials. Grey-Rock "Standard Sets" are made by the United States Asbestos Division, Manheim, Pa.

PERFECT RELINES On Any Job



1. Mike the Drum

2. Set the Grinder to size

3. . . . then grind

with the LEMPCO BRAKE PERFECTOR

Using a Lempco Brake Perfector on a relining job means the difference between a good and a perfect job . . . a satisfied customer and a dissatisfied one . . . a job that's right from the start and one that comes back for free adjustments.

It stands to reason that when the lining is ground on the car — to fit the drums — there is 100 percent contact between

lining and drums. This means a soft pedal and perfect braking action when the car rolls out of your shop.

With this machine in your shop you can get all the relining business in your locality. It will give you a powerful merchandising story, and your satisfied customers will be your best advertisers. Write today for complete details.

Write for terms of
Lempco's Easy Payment Plan

LEMPCO PRODUCTS, Inc.
BEDFORD, OHIO

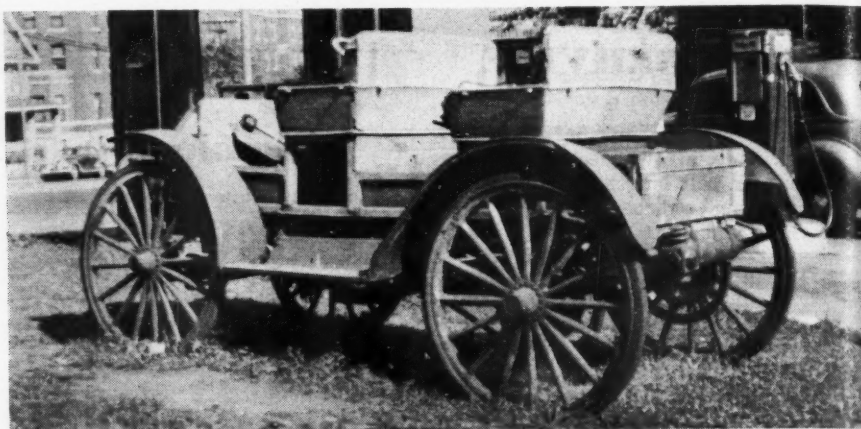
Send me catalogs and full details on the Brake Perfector.

Name

Address

City State

EYE CATCHER This 1906 model International electric is selling about 25 extra gallons of gasoline a day for I. K. Amundson, Kansas City operator. Curious motorists stop to examine the antique on display in front of the station, and buy gas, oil and service.



Pistons loaded with SIMPLEX "LL" Rings overcome all obstacles. Compression is forced into power expected of it—without loss from blow-by; carbon doesn't even get a chance to form; oil is forced to quickly retreat back into the trenches instead of throwing up a disturbing smoke screen; there are no barbed wire scratches on the cylinder wall because the softer sections of "LL" Rings protect the walls and prolong engine life.

No, there are no "slacker" pistons when "LL" Rings are around. Double-quick is the order—double LL's, the rings—long-life reconditioning the objective, and they make it without a come-back.

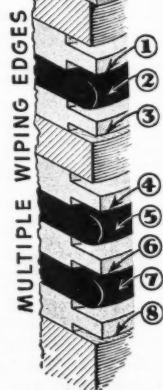
Get complete information on this popular reconditioning method from your Simplex Distributor. This method will save you money and satisfy your customers.

SIMPLEX PRODUCTS CORP.
3820 KELLEY AVE. • CLEVELAND, OHIO



SIMPLEX "LL" PISTON RINGS

"Do a better job - give 'em 'LL'!"



For quicker seating and longer life, segments of different degrees of hardness are alternated in the groove. The softer, deeper segments wear down while the ring is seating, protecting the cylinder wall. The tougher, hardened sections carry on after the seating, for long life.

General Tire Reports

Earnings and Expansion

The General Tire & Rubber Company realized a net profit for the fiscal year ending Nov. 30, 1940, of \$595,916.95, after all charges and Federal income taxes, on net sales of \$23,214,314.11. The company's statement shows net current assets of approximately \$9,000,000. Inventories at the end of the year were approximately \$1,500,000 over the levels of a year ago due in large measure to stocks of crude rubber maintained because of conditions in the Far East. The company is reported to have practically completed liquidation of its inventories and receivables in Holland and the Scandinavian countries, without appreciable loss.

The company has a management contract with a Venezuelan company whose plant is under construction. It is expected that production of tires will start in March. Preliminary negotiations have been completed for the formation of a company in Chile to manufacture tires.

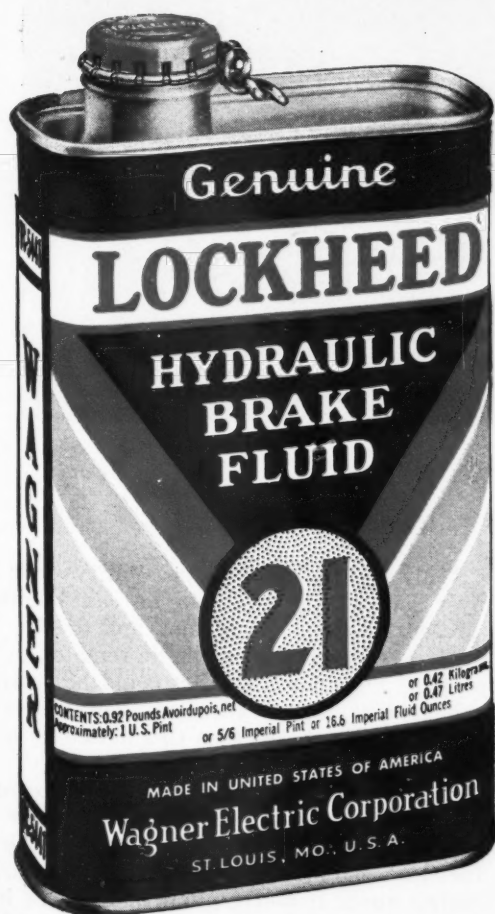
William O'Neil, president, also announced that construction has been started on a new building which will increase the factory floor space of the Akron plant by approximately 25 per cent. All plant facilities are now operating at full capacity.

O'Neil points out that the favorable outlook in the replacement market is especially important to General, which does no passenger car original equipment business, but concentrates on the production of tires for retail sale through dealers. The company is announcing two new tires to meet the increased demand of car owners in every income bracket.

Heads G-E Media Dept.

The assignment of responsibility to D. S. Mix for media and publishers relations, General Electric publicity department, Schenectady, has been announced by R. S. Peare, manager of G-E's publicity department and broadcasting. Under his new duties, Mix will have responsibility for the work formerly handled by the late F. R. Davis.

Everything is in your favor when you use **WAGNER LOCKHEED HYDRAULIC BRAKE FLUID**



- It is the best known, most universally accepted, and most extensively advertised brake fluid on the market

Only Lockheed No. 21 Fluid Has ALL These Advantages

- 1 Assures year-round operating performance.
- 2 Functions in sub-zero temperatures.
- 3 Amply lubricates the system over the operating range of temperature.
- 4 Maintains chemical characteristics after long use.
- 5 Maintains its high operating temperature characteristics.
- 6 Mixes with other approved fluids.
- 7 One mixture for *all* seasons . . . Reduces inventory.
- 8 One mixture for *all* cars and trucks . . . Reduces inventory.
- 9 A proven product . . . Used by car manufacturers.
- 10 Nationally advertised . . . Has consumer acceptance.
- 11 Warehoused throughout the United States and Canada at 25 Wagner branches.
- 12 Packaged in five sizes of containers: 5-gallon, 1-gallon, quart, pint, and 3-ounce.
- 13 A product of Wagner Electric Corporation, manufacturers of Lockheed Hydraulic Brakes.
- 14 Available everywhere through leading jobbers.

**Clip and Mail
Coupon for
FREE material**

AUTOMOTIVE PARTS DIVISION
Wagner Electric Corporation
6400 Plymouth Avenue, Saint Louis, Mo., U.S.A.

Send data on No. 21 Fluid on Fluid-Bal on Refiller Send
FREE book "How to Bleed Hydraulic Brake Systems."

Name

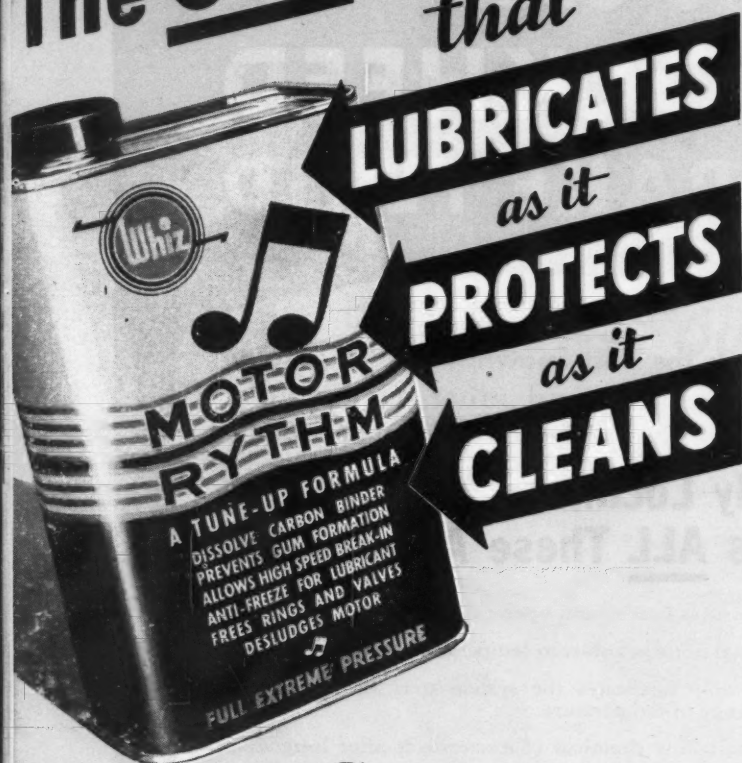
Firm and Position

Address

City and State

I Buy My Parts From

The **ONE** "tune-up" that



Get dollars ahead in Spring "tune up" profits with the "tune up" that's ahead of them all... **WHIZ MOTOR RYTHM**.

No other product does the complete job. **MOTOR RYTHM** cleans—removing and preventing carbon, sludge, gum and motor varnish. **MOTOR RYTHM** super-lubricates—freeing sticky valves, assuring smoother, freer running engines. **MOTOR RYTHM** protects—safeguarding vital working parts by the toughness of its film.

Constant advertising, in *The Saturday Evening Post*, every other week—year after year—has sold the **MOTOR RYTHM** habit to hundreds of thousands of car owners. Powerful **MOTOR RYTHM** merchandising aids draw these pre-sold customers to you.

Ask your jobber salesman to show you the **WHIZ MOTOR RYTHM** Profit Program.



**MOTOR
RYTHM**

R. M. HOLLINGSHEAD CORPORATION, CAMDEN, N. J., TORONTO, CAN.
World's Oldest and Largest Manufacturers of Automotive Chemicals

TO THE LADY



THERE'S always the remote possibility that your employer has all the business he can handle; or that his present customers are not apt to die, move away, or otherwise desert him while he remains in business; or perhaps his shop is all that could be desired as far as management, appearance and service is concerned. In any one of these cases this article is not for you, so read no further.

If, however, this isn't the case at your place of employment, then you're just the person to make some nail-on-the-head suggestions. They impress the boss with the fact that you're interested in his business, that you're thinking about it alertly, and that you're intelligent. When your suggestions click (and they can't help but do that if you think with the afore-mentioned intelligence) you will find that you're a much more valued employee with all that that phrase means in security, salary, favor, etc.

First and foremost always remember that you are a woman. Keep your feminine viewpoint and don't let any man talk you out of it. Remember, this viewpoint is your stock in trade, for if you get to seeing things too much his way, you lose your perspective and your ability to contribute towards the improvements.

Now, look at the shop as a woman does—as the customer must. How does it strike you? Is it clean? Attractive? Does the place give the impression of being up-and-coming and the men seem to know their work, or do listlessness and apathy overrun the atmosphere? Do the customers have to spend much time in the waiting room (we hope not)? Is it comfortable—

OF THE SHOP

Yes there are stenographers, bookkeepers, bosses' daughters, help-mates actively engaged in this service business. To them, these columns are especially dedicated

By ROSE LU GOLDMAN

equipped with new magazines that would interest a woman? And the rest room? What do *you* think of it? We hope the wash basin doesn't boast a cake of yellow laundry soap, as we found in one rest room lately. The proprietor may have felt that this was just a "trifle" but if he did, then he certainly shouldn't mind remedying it, and I can assure you the lady who told me about it, didn't think it was any trifle.

As to the actual service—is it dependable? Prompt? Reasonably priced? Do they make it as convenient for the ladies as possible by offering a call-and-delivery service? Honestly—if you had a car would you bring it here for service?

Now that you've thought it all over, what improvements would you suggest? But be careful that they are *suggestions*, and not out-and-out criticisms. A man's business is dear to his heart, and your tact in presenting your suggestions will determine to a large extent whether or not they're given a fair trial.

Here's one suggestion which I offer. You are the best judge of whether or not it will go over in your town, of course, but what do you think of offering the Women's Club, the P.T.A., or the church auxiliaries, a lecture, or series of lectures on driving in return for a specified amount of business brought to your shop, proof of which is shown by the collected receipts. You can set the amount at whatever you think would pay, and as for getting the lecturer—that's easy. Your local automobile club, driving school, or even your high school if it offers a course on driving, can help you out.



IN THE SERVICE OF THE U. S. NAVY and ARMY for 31 YEARS

Continuously, since 1909, the U. S. Navy and Army and many government departments have selected Hollingshead products for their requirements.

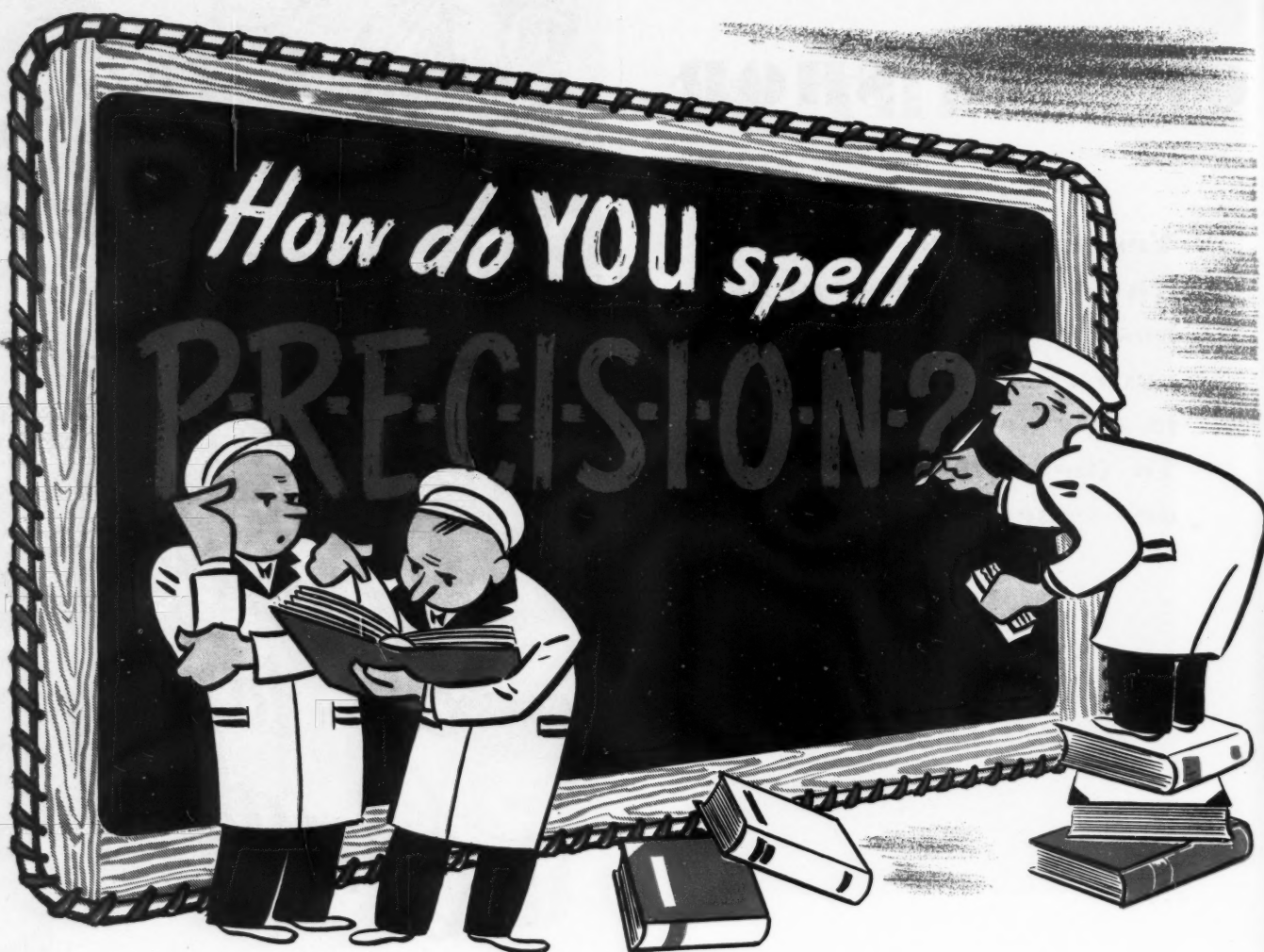
Hollingshead chemists are working in close collaboration with our government to produce many of the secret and vital formulas necessary in the operation of America's armed land and sea forces.

Whiz "WHIZ" identifies products supreme in quality. Let the name "WHIZ" be your buying guide.

CAR BEAUTY and MAINTENANCE PRODUCTS

POLISHES • CLEANERS • TOP DRESSINGS • TIRE COATINGS
RADIATOR SPECIALTIES • BRAKE FLUIDS • ENAMELS
SHOCK ABSORBER FLUIDS • GASKET CEMENTS • SOAPS
ABRASIVE COMPOUNDS • SPECIALIZED LUBRICANTS

R. M. HOLLINGSHEAD CORPORATION, CAMDEN, N. J., TORONTO, CAN.
World's Oldest and Largest Manufacturers of Automotive Chemicals



WANT TO BE SURE of *accuracy* in replacement work on Ford units? Want to make every Ford customer your booster? Want to make a good profit on parts as well?

Then use only Genuine Ford Parts on Ford work. These replacements are made to the same close tolerances as the original parts. Their precision is guarded by

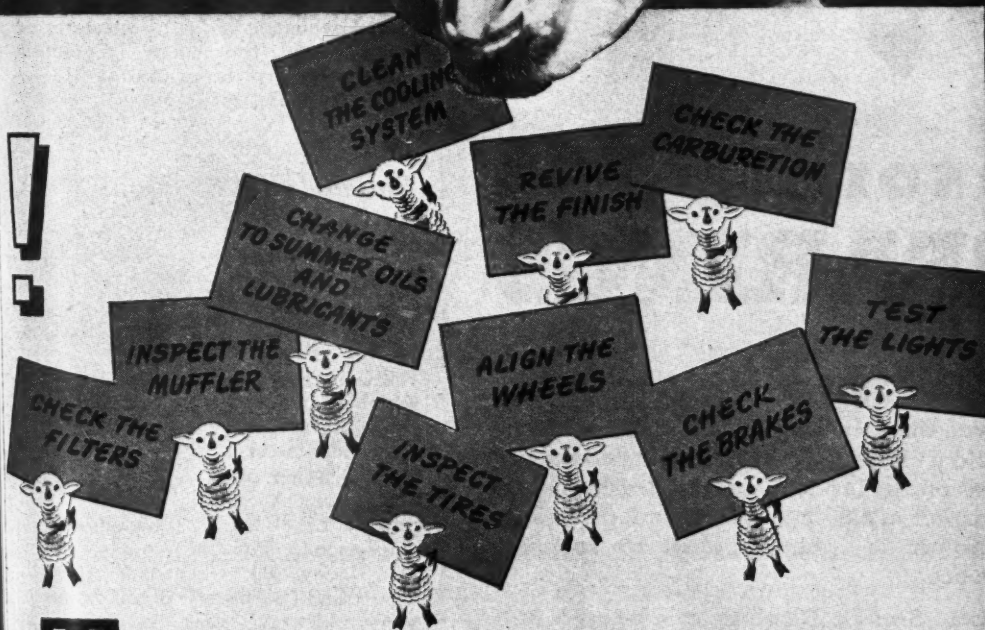
astonishing tests . . . by machines like the Ford profilometer that measures surface smoothness in *millionths* of an inch.

Genuine Ford Parts fit right the first time. No reworking to do. They stand up—because there's no variation in quality. And they allow you a generous discount! For details—call your Ford Parts Distributor.



FORD MOTOR COMPANY
SERVICE DEPARTMENT • DEARBORN, MICHIGAN

**HURRY! HURRY! HURRY! GET YOUR
TIE-IN MATERIAL FOR THIS TUNE-UP
SPREAD APPEARING IN COLLIER'S MARCH 29**



Tune up your car

The thrill you get from a modern tune-up is second only to the joy you experienced when you took delivery on the car. Tune-ups have been tuned up, too!

Today, the people who get the biggest kick out of motoring follow the Preventive Service idea. They know what can be done by the modern, tuner-upper—and they love it.

A new era has been born in the servicing of automobiles. Skill and equipment have made the service man a miracle man who can look at his recording device and tell what's going on inside the car.

The thing to do is to see your service man now and have him give your car a Spring Tune-up. He can bring back that new-car "feel"—that delightful sensation of pressure at the small of your back when you step on the accelerator.

The Ignition System

The modern car achieves such outstanding performance because it is so finely engineered. To be so sensitive in responsiveness requires precision adjustment. And it needs frequent tuning because, like a fine musical instrument, it will get out of tune.

In putting your car back to its original factory specifications, the service man will check right through the ignition system from the spark plugs to the battery—making important stops at the distributor and the coil, on the way. When he has put all in good order, he will bring the timing to the critical point of greatest fuel economy and power—not by guess but by scientific instrument.

The Power Plant

With the touch of a concert stalinist

Trouble at this point can be costly in loss of power and loss of mileage. The carburetor handles about 70 gallons of gas and 100,000 cubic feet of air every 1,000 miles. You can't afford to have such an important device even slightly out of whack, any more than you can afford not to use high-test gasoline.

Before leaving this "department," the

winter oils and lubricants should be replaced with summer grades. The oil filter should be given a nice fresh, clean element and the air filter should be cleaned. Finally, the exhaust system should be checked to see that there are no leaks or loose connections.

The Running Gear

The wheel alignment is an important part of the Spring Tune-up. Wheels get knocked out of line in the regular course of travel—but winter roads deliver the worst blows. Alignment and balance are scientifically checked by the service man

and when the wheels are put back to their original factory specifications, you get greater tire mileage along with easier steering and more pleasant riding.

The Cooling System

By all means, see that the anti-freeze is drained out of the cooling system and the inside of the radiator cleaned. But don't stop there. See that the fan belt, radiator hose and gaskets are in good condition to carry you through the summer.

Safety and Protection

Under this classification, you will have the brakes tested and balanced. You will want your lights adjusted, cleaned and renewed, if necessary. You will want the tires checked for anti-skid tread and for the condition of the tubes. Finally, you will want this tuned-up car to look as good as it runs and this calls for the scientific cleaning of the finish, plus waxing and polishing to give it both beauty and protection.

The Complete Job

Practically all places that service automobiles are prepared to render a complete Spring Tune-up at a reasonable price. See your service man now for Preventive Service.

P.S.

PREVENTIVE SERVICE

*Sponsored by Collier's
for Motor Car Owners*

Spring Tune-up is a complete service. It includes: oil and filter change, carburetor cleaning, radiator flushing, fan belt adjustment, tire inspection, wheel alignment, brake inspection, light adjustment, and a general inspection of the entire car.

Oberheu to Introduce New Plastic Service for Motor Cars

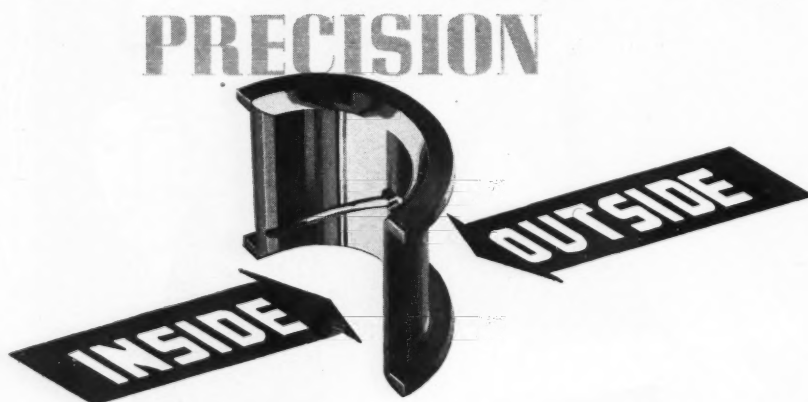
F. A. Oberheu, who is well known in the automotive service field and who for many years headed United Motors Service activities, is now associated with the Composite Materials Corp. of Detroit. This company has developed a sound deadener, now commonly used on door panels and various parts of an automobile body. They have now developed a new rubber and resin and plastic material containing sound deadening ingredients that can be applied to exposed surfaces. This new plastic material

will be known as "Mute," the plastic sound deadener for motor cars. With the use of a small tank and special spray gun, this plastic can be applied under the hood and the underside of fenders and all exposed floor boards and undercar parts. This material air-dries, and after it is cured it will withstand 20 deg. below zero or 300 deg. F., and will not drip or sag, crack or chip at any outside temperatures. It is odorless and fireproof, and can be applied on a painted surface and give a perfect bond. This same material will also give excellent sound-deadening results in trunks and luggage compartments, and only a spray

coat can be used in any and all sound-generating nooks and corners of a body.

On new cars, the surface to be sprayed need only be cleaned of dust and oil, and on cars, ambulances and commercial vehicles now in use, the surface must be steam cleaned or washed with a solvent to remove all oil and grease. After removing the wheels and raising the car with a hoist or one-end lift, the spray job can be completed in about two hours. The car can be run within a few hours after the plastic "Mute" is applied. Normal running on wet paved streets will not affect this material, and it is only recommended to keep off of sand and gravel roads for approximately two days in order that the material is thoroughly cured before being subjected to stones thrown by tires. After a thorough air cure has taken place, there is no further danger of the material chipping or being distorted regardless of weather, salt, chlorine or alkali picked up from road surfaces.

As soon as a reasonable number of stations and service distributors have been appointed, Oberheu states that an extensive advertising program will be launched to bring this new plastic sound deadener to the attention of car owners and the trade. Composite Materials Corp. is located at 515 Ly-caste Ave., Detroit, Mich.



Johnson Slip-in BEARINGS

● **PRECISION** . . . in bearings is measured in more than one way. It is just as important to hold a close tolerance on the outside diameter as on the inside diameter. Bearings must be *correct* in all dimensions in order to secure the proper fit . . . the expected life and performance.

Johnson *Slip-in* Bearings can be sold and installed with complete confidence and comparative ease. Every bearing is correct in alloy . . . in design . . . in all tolerances. The same high standard of quality demanded by car manufacturers governs the production of replacement parts. There are no second or third grades of Johnson merchandise.

Why not give Johnson Bearings a fair trial? Complete stocks for all makes of cars and trucks are available for immediate delivery. Write today for a copy of our new catalogue.



JOHNSON BRONZE
Sleeve BEARING HEADQUARTERS
455 S. MILL STREET • NEW CASTLE, PA.

Philadelphia Elections

J. Eustace Wolfington, Wolfington Motors, Inc., Philadelphia, was elected president of the expanded Philadelphia Automobile Trade Assn. at the annual election last month. Other officers are: Vice-president, John H. Gardner, Upper Darby, Pa.; treasurer, Geo. H. Thornton, Thornton-Fuller Co.; secretary, J. Harry Speck, Speck-Cadillac Co.



J. E. Wolfington

Newly elected directors who will serve with six other director carried over are: Martin H. Bury, Bury-Holman, Inc.; John J. Morrison, Quaker City Motors; R. E. Nittinger, Russell E. Nittinger, Inc.

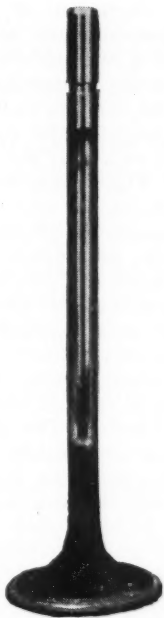
The annual meeting marked the induction of nearly two hundred new members into the association, drawn chiefly from the Automotive Service Assn. of Philadelphia. While A.S.A. will continue to function separately, by-law changes permitted membership in the P.A.T.A. and the naming of a special director from A. S. A. to function on the board of P.A.T.A. A. S. Williamson, A.S.A. president, was selected to represent the servicemen on the P.A.T.A. board.

(Advertisement)

"WE WERE THERE"

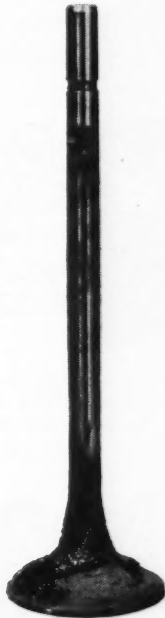
... Say These Three Witnesses

These three unretouched photographs show the results of tests of three nationally sold, popular brands of motor oil.



CARBON ... TRACE

Stabilized Quaker State Motor Oil. After comparative test ... valve shows very slight carbon accumulation.



CARBON ... HEAVY

30¢ motor oil. After comparative test under the same conditions ... valve shows heavy carbon accumulation.



CARBON ... EXCESSIVE

25¢ motor oil. After comparative test under same conditions ... valve shows dangerous carbon accumulation.

● The New Stabilized Quaker State Motor Oil is a long step forward in cleaner, better, safer lubrication. Make no mistake, it is a real refining improvement ... not just conversation. The unstable elements in motor oil that promote oxidation and cause sludge and varnish deposits have been removed.

You can quickly enjoy, in your own car, a new freedom from the expense and annoyance of engine damage and inefficiency which may accompany the use of inferior motor oils.

You will then be happy to recommend the New Stabilized Quaker State Motor Oil to all of your customers and friends. Quaker State Oil Refining Corporation, Oil City, Pennsylvania.



The New **STABILIZED QUAKER STATE MOTOR OIL**

WHEEL ALINEMENT

(Continued from page 29)

angle. Should it be necessary to change the camber angle, first loosen the clamp bolt, 1 (Fig. 1) in the end of the steering knuckle support arm. Then turn the bushing (as shown at 4, Fig. 1) so that the high side of the eccentric will move the support arm away from or toward the inside of the car to obtain the correct camber reading. If the caster angle is properly set first, the correct camber angle will be obtained within $\frac{1}{2}$ turn of the

bushing from its correct caster position.

Toe-in should be measured from a point in the center of the tire tread, and at a height from the floor equal to the height of the center of the hub.

First place the wheels in a straight-ahead position. Mark the tires at the rear and then measure the distance between the two—roll the car forward until the marks are in the front and at the same height as they were when the rear measurements were taken. Then measure the distance between the two tires. They should be from Zero to $\frac{1}{8}$ " closer together at the front than at the rear.

This Snap-on Grinder has everything!

Plenty of protection with this guard if the wheel should blow. Safe spark shield, too!

Plenty of backbone in this rotor shaft.

Run it full load long as you like... windings and rotor built for continuous duty.

What chance has grit got to get past this nifty anti-friction grease shield!

These wheels hold alignment! Look at the length of that flange bearing. Diamond-bored, too!

Nope! No solder. Every connection silver-brazed. Rotor plates silver-brazed. All windings varnish-baked for 8 hours.

You couldn't slip a gnat's hair between bearings and housings. The SKF's are fitted to .002".

Adjustable double-face tool rests, also rigid base, approved cord and switch.

Husky enough to handle welds and other heavy-duty grinding... smooth and vibration-free in performance... built to stand the gaff of all-around shop work and all-day operation... these features earn a place for this grinder whenever time is short and tools must "tell". $\frac{1}{2}$ H.P. 110 V. AC-DC motor is designed for continuous service without overheating, and bell-housed for handling large or odd-shaped pieces. Two 7" wheels come with each grinder. Motors wound for

other than 110 V. AC-DC also available, as well as $\frac{1}{4}$ H.P. and $\frac{1}{8}$ H.P. models. See your Snap-on salesman or write...

SNAP-ON TOOLS CORPORATION

Dept. MA-2 Kenosha, Wisconsin

MORE REPAIR WORK... FEWER TO DO IT!

TOOLS WILL TELL IN '41!

Snap-on

SERVICE TOOLS
The Choice of Better Mechanics

If it is necessary to adjust toe-in, loosen the clamp bolts on the ends of both tie rods, and turn both tie rods an equal amount until the wheels are straight ahead with no toe-in and the steering gear in center position. Then turn both tie rods an equal amount until a toe-in of $\frac{1}{16}$ in. is obtained. Then tighten the clamp bolts.

PLYMOUTH CLUTCH SERVICE

(Continued from page 19)

levers parallel to the release bearing because of variation of the driven plate. Adjustment can only be done by means of a special clutch fixture.

To remove the release levers, grasp the lever and the eye bolt as shown in Fig. 7, keeping the eye bolt pin seated in its socket in the lever.

The strut, Fig. 7, can then be lifted over the ridge on the end of the lever, making it possible to lift the lever and eye bolt off the pressure plate.

To reassemble the clutch cover and pressure plate, reverse these instructions taking care to place the pressure springs in position so that they rest in the small bosses of the pressure plate and engage the embossed seats on the cover. The grease pads are placed on top of the drive lugs, making sure that the holes in the pads are over the eye bolts. Pads should first be lubricated by dipping them in hot melted grease and then allowed to cool before installation.

Grey-Rock Jobbers to Offer New Shoe Exchange Plan

To meet the growing demand for shoe exchange service, Grey-Rock has offered its jobbers a new plan, under which each shoe will be completely reconditioned—thoroughly cleaned, examined for imperfections, painted, relined with the correct Grey-Rock material, checked and re-arc'd if necessary, tagged and boxed.

Grey-Rock jobbers will offer these completely reconditioned shoes on all popular model cars. The plan includes complete cataloging, an improved and simplified method of identification and a pricing system that allows a worthwhile profit to the jobbers' customers.

Ab Jenkins On Hand

Those, who visited American Hammered's exhibit at the 1940 A.S.I. Show, saw Ab Jenkins' Mormon Meteor III in which he broke every world's record from 50 kilometers to 3000 miles, and from one to 24 hours, last July, using American Hammered Piston Rings. It had been brought overland by specially constructed truck to give show visitors what, to most of them, was their first close-up of such a car. Its driver, Ab Jenkins, currently mayor of Salt Lake City, was present in person.

How'd you like to see YOUR NAME HERE?

A MAN'S name linked with the sign of a Buick dealership means many things.

It means he thereby takes a special place as one of the substantial businessmen of his community.

It means he joins an organization which for several years past has been setting records in number-of-cars-per-dealer sold each season and in average dealer volume.

It means he links his fortunes with those of a car which has been moving dramatically forward for the past half-dozen years, a car with traditions dating back to the very beginnings of this industry.

It means the kind of business relationship in which teamwork is the essential characteristic — the kind of teamwork that means the factory takes an interest in the dealer's welfare in return for the dealer's doing likewise.

Can you get your name in a spot like this?

It's not impossible. Openings are not numerous, naturally—a deal such as Buick offers doesn't go begging for takers.

But here and there we have a few open points we'd like to fill with the right kind of men—men with eyes on the long view and with a willingness to work to build themselves something good.

If you'd like to know about these opportunities, drop a line giving a few details about yourself to:

WM. F. HUFSTADER,
General Sales Manager,
Buick Motor Division,
Flint, Mich.



"Best Buick Yet"

EXEMPLAR OF GENERAL MOTORS VALUE

WHEN BETTER AUTOMOBILES
ARE BUILT
BUICK WILL BUILD THEM

Lower Price Buicks Added to 1941 Line

Bringing Buick "very close in price to the three other high volume producers in the lowest price field," Harlow H. Curtice, president of G.M.'s Buick division announced the addition of four new models to the 1941 Buick Series 40 Special line. The new cars have new torpedo styling, and are three inches shorter in wheelbase, six inches shorter in overall length. Deliveries to dealers for public showing was scheduled for February 1.

The new models are built on a

shortened Buick chassis having 118-inch wheelbase and include a six passenger, four door sedan, six passenger sport coupe with full width rear seat, three passenger business coupe, and six passenger convertible coupe with automatic top.

Delivered prices at the factories of Flint range from \$915 to \$1138, representing reductions from \$20 to \$31 under corresponding models of the 121-inch Series 40 models, and \$129 under the 121-inch wheelbase Series 50 convertible coupe, the next largest convertible in the Buick line.

With the exception of the three inch reduction in wheelbase, they have

identical chassis units with the 121-inch wheelbase Series 40 cars, with radiators, hoods, and sheet metal the same as in the larger series and body trim, interior equipment and appointments identical within the limits of the new body styles.

Such standard Buick features as for-n-aft direction signals, actuated by a lever on the steering wheel post, remote control gear shifting, courtesy lights operated by door jam switches, concealed running boards, ash trays, assist cords and other interior conveniences are standard equipment on the new cars. Upholstery materials of the same specifications as the larger series 40 cars will be used. Similarly the same paint combinations are specified.

The new cars are powered by Buick's valve-in-head straight eight "Fireball" engine developing 115 hp. at 3500 r.p.m., with optional compound carburetion raising horsepower to 125 at 3800 r.p.m. This is the same engine used in the Series 40 and Series 50 Buick cars, and with a higher power weight ratio in the new models delivers slightly improved performance and economy.

Other chassis units are identical such as torque tube drive, coil springs on all four wheels, knee action front suspension, hypoid rear axle gears, hydraulic brakes, all helical gear synchromesh transmissions, X-type frames and the like.

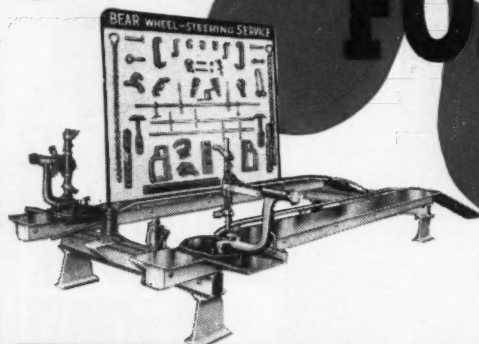
Repairs Casing Breaks

The latest product of Bowes Seal Fast Corp., Indianapolis, Ind., is the Bowes Electro-seal, designed to make repairs of those clear-through-the-cas-



ing breaks. The machine is fully automatic and is equipped with a built-in thermostat switch which automatically maintains the needed temperature. Additional equipment includes a small sandbag, a valve stem mandrel, separate aluminum plate for use on sidewall repairs, a stand for supporting the tire while in the machine, and a supply of specially prepared Lectro-seal material for use in making these repairs.

HERE'S LUCK FOR YOU!



BEAR NEW "195-82" ALINEMENT UNIT

Here's the New Bear Unit that really puts you into the profitable alignment business with both feet. A unit that is priced down where you can afford it, but one that gives you all the tools and gauges you need to do fast, accurate inspection, checking and correction of toe-in, camber, caster, king pin, and turning radius of all cars. No extra figuring necessary—all dial readings are complete. Frame Straightening Equipment may be added later.



THERE'S NO TIME TO LOSE!

Get in on the ground floor. Be ready to cash in right from the beginning on the Bear Lucky Program, nationally advertised in "Time" and "Collier's."

Genuine 4-LEAF CLOVERS

ABSOLUTELY FREE!

HERE'S how to get a preview of what's going to happen next month: Send for a genuine Bear Four Leaf Clover. Show it to a few customers. See how they all "go" for it...

Next month, when the big Bear ads start breaking in TIME and COLLIER'S Magazines, every motorist in town is going to know about these lucky charms, everyone will want one... and Bear Dealers are going to reap a harvest of new customers by being able to supply the demand.

You get much more than a fine piece of equipment when you do business with Bear. You get a merchandising plan to make that equipment profitable this year and next, and the years after that. Ask about the new Bear "195-82" Alinement Tester — priced to fit your pocketbook and sold on Bear Jobber's Easy Payment Plan. Write for details, and Your Free Lucky Clover, right now. Bear Manufacturing Company, Rock Island, Illinois.

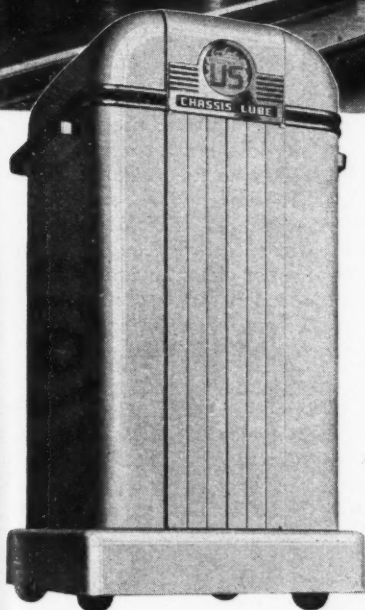
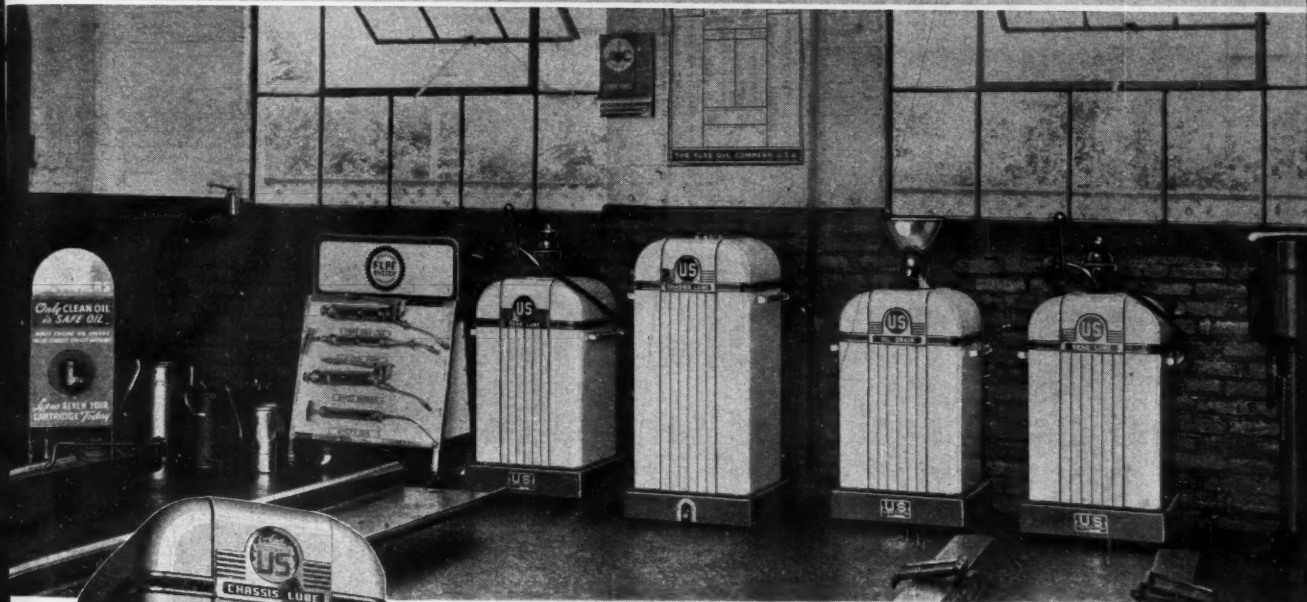
Copyright 1941, Bear Mfg Co

Be the Lucky One!

GO with BEAR in '41!

Write Bear Mfg. Co., Rock Island, Ill., Today!

U.S. First



Ask any of the thousands
of U. S. users.

U. S.—First in Single *UNITS* or *SQUADS*

U. S. Lubricating units are designed and built for a specific job yet each is part of a whole, dovetailing into a perfect squad which gives you the most formidable lineup of lubricating equipment in the world. Operate efficiently, alone or collectively, depending on your needs. As snappy, neat and clean in appearances as a marine, they attract attention everywhere. U.S. Lubricating units are mobile, rangy and thrive on action—you can depend on them at all times. They pack such exclusive features as the famous U.S. patented Jack-in-the-box covers. Entire cover is raised by air, held in that position while operator easily slides out empty grease drum and slips in the other without dirtying or marring the beautiful cabinet.

U. S. Patented pumps used in lube units are the talk of the trade and after several years usage are still years ahead of the field.

THE UNITED STATES AIR COMPRESSOR COMPANY

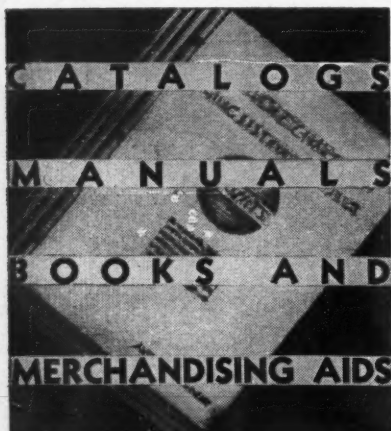
Cleveland, Ohio, U. S. A.

AIR COMPRESSORS

GREASING EQUIPMENT

HYDRAULIC LIFTS





To receive a copy of the free literature mentioned in some of the following items, just check the square on the postcard on page 84 which corresponds to the letter given the literature you desire.

The new 60-page 1941 Black & Decker catalog just off the press fully illustrates the complete line of 132 portable electric tools made by the Black & Decker Mfg. Co., Towson, Md. Check "A" on the post card, page 84, for your copy.

Champ Items, Inc., 6191 Maple Ave., St. Louis, Mo., has issued Catalog 500-G, describing the reconditioning short cuts they manufacture for practically all cars. Separate sections are devoted to products for Ford and Chevrolet cars, with the balance of the catalog listing general products for all makes. Your copy will be sent upon receipt of the post card on page 84, with a check mark in the "B" square.

Kant Rust Products Corp., Rahway, N. J., has issued new catalog sheets covering its line of penetrating oil, tune-up oil, gum solvent, rubber shackle lubricant and a complete line of oil cans and guns. A check mark in the "C" square on the post card, page 84, will bring copies of these pages to you.

The Brookins Mfg. Company, Division of The Cincinnati Ball Crank Co., Cincinnati, Ohio, has a new folder illustrating the new silver finish applied to the line of oil dispensers. Check "D" on the post card, page 84, for your copy.

The South Bend Lathe Works, South Bend, Ind., has just issued a new general catalog which is said to be one of the most complete lathe catalogs ever published. It has 112 pages and contains over 240 illustrations. It shows 50 different types and sizes of South Bend Back-Geared, screw-cutting lathes for manufacturing, tool room and general shop work. A copy will be mailed upon receipt of the post card, page 84, with a check in the "E" square.

If you will place a check mark in the "F" square on the post card, page 84, you will receive a very interesting and informative folder by the Shaler Co., Waupun, Wis., entitled "Engine Performance." This booklet deals with the care, lubrication, operation and tune-up of gasoline and Diesel engines, and contains interesting information on the subject of oils and their treatment.

Plomb Tool Co., 2209 Santa Fe Ave., Los Angeles, Cal., has announced its new Catalog No. 18-A covering its complete line of mechanics' hand tools. Copy will be sent upon receipt of the post card, page 84, with a check in the "G" square.

A new catalog by Berger Mfg. Division of Republic Steel Corp., Canton, Ohio, makers of "Berloy" steel bin and display case equipment, describes the 1941 line. Open display merchandising tables are featured, in keeping with the modern trend of part and accessory display. Get your copy by checking "H" on the post card, page 84.

Make Your Jobber Talk!



He's got sensational news for you on LINK-BELT ROLLER BEARINGS!



THE PERFECT REPLACEMENT FOR FRONT WHEELS DIFFERENTIALS AND REAR AXLES

We don't suggest a "third degree" but we do know that you'll learn something very much to your advantage by asking your jobber to explain why Link-Belt roller bearings are able to give such amazing performance. He will show you why by telling you how the exclusive convex-concave rollers and raceways assure constantly smooth action and compensate for wear so that this bearing lasts far longer. On your next job—be sure to replace with Link-Belt roller bearings—you can't give your customers anything better!

LINK-BELT COMPANY

519 N. Holmes Ave., Indianapolis, Ind.
Warehouses in all principal trading centers
Made by the makers of the famous Silverstreak Silent Timing Chain!

LINK-BELT SHAFTER ROLLER BEARINGS

121E Make big profits on a small investment in SHURHIT IGNITION PARTS. Shown on page 121. Ask your jobber about this profitable line or check postcard for complete information.

121F At last! The WHITE TIRE COATING that doesn't crack, chip or peel . . . because it's rubber and because it's a WHIZ product. It's shown on page 121. Write direct or check postcard for further details.

121G Your customers will appreciate the added gas saving they can obtain through your recommendation of BLUE CROWN SPARK PLUGS by MOTOR MASTER PRODUCTS CORP. See page 121. Write or check postcard.

121H That old "horse of a different color" is still hanging around in a THERMOID PRE-STRETCHED FAN BELT on page 121. THERMOID can do a job for you, too. Write for details or check postcard.

122A With a HANDY SUPER SERVICER by BALDOR ELECTRIC CO. your BATTERY SERVICE department is in top shape. See it on page 122. For complete information write or check postcard.

122B Page 122 finds CHARLOTTE SOUTHERN, our friend with the SOUTHERN BRAKE LINING in an Army camp. Have you checked into the SOUTHERN story? Write today or check postcard for information.

122C Don't miss the FREE OFFER made by WAYNE AIR COMPRESSORS on page 122. Clip coupon today or check postcard, for further details.

122D Miles of smiles . . . with never a kick-back from a dissatisfied customer. Why? They're using TIMKEN BEARINGS that you've installed. Page 122. Write or check postcard for information.

122E With winter setting in, it's smart to have PAX-WELD on hand to take care of those cracked valve ports, cylinder heads or water jackets. It's shown on page 122. Write JOHN S. McKENZIE or check postcard for details.

122F Here's the quick, efficient, economical answer to your tire repair problems . . . SPEAKER MATCH PATCHES. Read about them on page 122. For details write direct or check postcard.

122G Buy at the sign of the LION . . . your guarantee of dependable quality AUTOMOTIVE PARTS, SUPPLIES and ACCESSORIES. See page 122. Write direct or check postcard for further details.

122H For seals of security . . . industry depends on VICTOR GASKETS, OIL SEALS and GREASE RETAINERS. They'll make money for you, too. They're on page 122. Write for further details or check postcard.

123A Check with your jobber on the LEONARD AIR-COOLED SPARK PLUG for Chevrolet Replacements. If he hasn't the story told on page 123, write direct or check postcard for complete details.

123B Save yourself time and money by using NOC-OUT HOSE CLAMPS made by the WITTEKER MFG. CO. This handy and profitable item is shown on page 123. Write for details or check postcard.

123C For the handiest FLEXIBLE CONTACT DRESSER try RINCK - McILWAINE'S FLEX-STONE and notice the difference. Don't fail to read page 123. For details write direct or check postcard.

124A Here's the fastest-selling item in the ever-popular SINKO line . . . the SPIN-UR-WHEEL CONTROL and Matching Gear Shift Bail. See page 124. For details write or check postcard.

124B Read page 124 for the dope on the latest, fastest, most efficient automotive parts CLEANER out . . . SOAX. It's good . . . it does the job . . . it saves you time and money. Write or check postcard for details.

124C The HERMIL CO. has an interesting proposition for you on page 124. Renew your own FLOOR MATS or those of your customers for a few cents. See page 124. Write or check postcard for details.

124D Are you missing a bet? Those extra profits from wheel-balancing would come in mighty handy. Don't miss the HARLEY C. LONEY CO.'S story on L & H WHEEL BALANCING WEIGHTS on page 124. Write direct or check postcard.

124E The tool for every metal refinishing shop . . . the 7" PORTABLE ELECTRIC SANDER made by UNITED STATES ELECTRICAL TOOL CO. is shown on page 124. Write or check postcard for further details.

124F Let your ARO jobber show you the ARO SPEED COUPLER. Put your air hose to work on multiple duty with this fast dependable connection shown on page 124. Write or check postcard.

125A The perfect replacement line for cars, trucks, buses, tractors and farm machinery . . . PRATT TAPERED ROLLER BEARINGS shown on page 125. Write or check postcard for further details.

125B Winter's here! Don't let the deceptive weather fool you into putting off buying that stock of WEED AMERICAN BAR-REINFORCED CHAINS. Page 125. Write for complete details or check postcard.

125C For running-in new and rebuilt engines there's nothing to surpass ACHESON COLLOIDAL GRAPHITE with "dag." Have you stocked up yet? See page 125. For details write or check postcard.

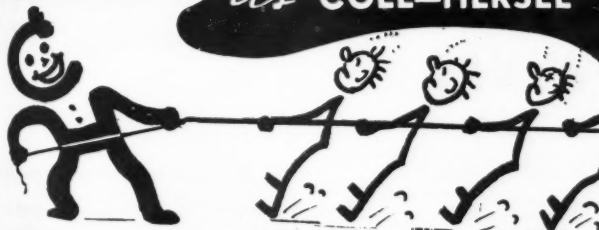
125D The new SPEEDWAY 3/4-in. No. 89 DRILL will handle that job quicker and more efficiently. See page 125. For further information write or check postcard.

125E Page 125 gives you a shot of the G.A.C. POWER-PLUS LINE . . . the line you need in that shop of yours when those tough body repair jobs drop in. For full details write or check postcard.

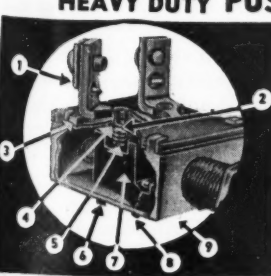
127 You'll have two great lines . . . complete market coverage . . . real cooperation when you handle the CHRYSLER-PLYMOUTH line. Asked for your DEALERSHIP yet? Page 127. Write or check postcard.

128 With a stock of COMMERCIAL SOLVENTS CORP'S NORWAY you have a profitable business in COOLING SYSTEM SERVICE. Try it and watch the business grow. Page 128. Write for details or check postcard.

When it comes to a "HEAVY DUTY PULL" it's COLE-HERSEE



HEAVY DUTY PUSH-PULL SWITCHES

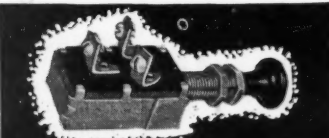


INSIDE CONSTRUCTION
Competitive switches do not have this interior construction for heavy duty work.

- 1—Heavy terminals with 8/32" screws and Shaleproof washers under the head.
- 2—"Sweep Clean" rivets, provide good contact at all times.
- 3—Extra heavy bakelite insulation.
- 4—Solid brass contact bar.
- 5—Two individual springs under contact bar in line with flush "Sweep Clean" contact rivets assuring contact at all times, and minimum voltage drop.
- 6 & 8—Independent CLICK action incorporated.
- 7—Molded bakelite contact carrier.
- 9—Heavy cadmium plated case.

EXTRA HEAVY DUTY TYPE 3-TERMINAL SWITCH

Providing plenty of wire attachment
38 ampere conservative capacity at 6 to 8 volts



SILVER INLAID CONTACT RIVETS AND SILVER FACED HEAVY BRONZE CURRENT CARRYING MEMBERS: GUARANTEES SWITCH WILL NOT OVERHEAT OR BURN. HEAVY CANVAS REINFORCED BAKELITE INSULATING MEMBERS. INDEPENDENT CLICK ACTION.

No. 5027
Large plastic screw-on knob, regularly furnished in black (ivory or tan as specified): 1/2" diameter mounting stem, 1 1/4" long.

Cole-Hersee Company
54 OLD COLONY AVENUE BOSTON, MASS.

Quality ELECTRICAL
AUTOMOTIVE EQUIPMENT
Send for any information to Dept. A-2

NEW LIGHT ON YOUR CLEANING JOBS



CLEAN MOTORS AND CHASSIS THIS EASY, INEXPENSIVE WAY

Want an easier, better way to clean-up greasy, grimy motors and chassis? Even if you do not have steam cleaning equipment, you can still do the work easily, quickly by using this simple, inexpensive Oakite method.

Just spray motors and chassis with a solution of Oakite Composition No. 9 and kerosene, then let soak a short time. Oil and grease deposits are thoroughly softened, so that the subsequent rinse removes them completely . . . leaves motors and chassis perfectly clean, film-free.

Write for FREE booklet that gives money-saving methods and formulas for this and many other cleaning jobs.

Manufactured only by
OAKITE PRODUCTS INC., 24C THAMES ST., NEW YORK, N. Y.
Representatives in All Principal Cities of the U. S. and Canada

OAKITE Certified CLEANING

MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

Grey-Rock Dealers Offered Personal Pledge Certificates

Grey-Rock jobbers in all sections of the country are now ready to offer their dealers Personal Pledge Certificates to be given to car owners after each brake service job.

Designed to insure better brake jobs for Grey-Rock dealers as part of the new National Safety Council Brake Service Schedule, the above certificate represents the personal pledge of the Grey-Rock dealer that the brakes on the owner's car have been serviced to National Safety Council Standards and



that he has used Grey-Rock Engineering Methods.



AWARD OF MERIT—"The Clutch Specialist," published by Monmouth Products Company, received the Motor Service 1940 "Award of Merit" as an outstanding example of service literature.

"THE CLUTCH SPECIALIST" WINS!

• The same knowledge of clutch problems and specialized engineering experience that made "The Clutch Specialist" an outstanding piece of service literature, are responsible for the exceptional quality and performance of Monmouth clutch plates and

clutch parts. • Whether or not you, too, become a Monmouth Clutch Specialist, you can benefit by the fact that Monmouth Clutch jobs "stay put," and perform without comebacks. Readily available from your NAPA jobber.

MONMOUTH PRODUCTS COMPANY • CLEVELAND, OHIO

Engine Bearings • Clutch Plates and Clutch Parts • King Bolt Sets



Master stocks of Monmouth Clutch Plates and Parts for all cars and trucks are maintained in NAPA Warehouses from coast to coast, assisting jobbers in every section of the country to give prompt service even on rarely called-for numbers.

For Clutch Service
Monmouth
Is the Name!

The certificate shows just what operations have been performed and when the car owner should return for the next brake inspection.

It will be recalled that at the suggestion of United States Asbestos Division of Raybestos-Manhattan, Inc., the National Safety Council set up a schedule of Brake Servicing Standards two months ago. This plan, designed for better understanding between car owner and service station operator, has been adopted widely in the industry.

Grey-Rock features the Personal Pledge Certificates for car owners in a season-long national magazine advertising campaign. Quantities may be secured from any Grey-Rock jobber or by writing to Grey-Rock, Manheim, Pa.



Mike Kosar, Akron, O., golf pro and automotive hobbyist, built this little runabout for his four-year-old son, Mike, Jr. It's motor came out of a discarded mowing machine, it has eight-inch wheel barrow wheels, it is belt-driven and has an effective braking system. Mike, Jr., uses it on the golf course. Its top speed is 15 m.p.h. Chief limitation seems to be that little Mike is likely to get too far from his source of supply when the gas gives out.

Collier's Readers Visit Dealers' Showrooms

20,783 people to part in a cartoon gag competition sponsored by Collier's magazine: One purpose of the competition was to demonstrate the active automotive interest of Collier's readers requiring the reader to visit the showroom of local automobile dealers to secure official entry blanks for the competition. The entries, in addition to giving the wording of the suggested gag lines, had to mention the name of the dealer. Mrs. Catherine A. Edmonston of Arlington, Va., has been awarded a prize of \$500 for writing a ten-word gag captioning the cartoon previously published in Collier's.

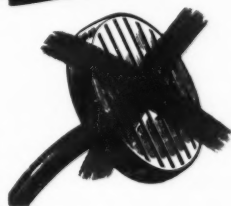
Holman Joins Bendix Staff

The Bendix Products division of Bendix Aviation Corp. has appointed Frank Holman sales engineer in the eastern territory for B-K Vacuum Power Brakes. For 12 years Holman was associated with The Autocar Co. of Ardmore, Pa., in the capacity of brake engineer.

OLDS DEALERS SELL "THE DRIVE THAT DOES EVERYTHING!"

Compare and See!

	DOES IT ELIMINATE THE CLUTCH PEDAL?	DOES IT DO AWAY WITH ALL CLUTCH PUSHING?	DOES IT GIVE YOU FULLY AUTOMATIC SHIFTING?	DOES IT GIVE FULL ACCELERATING POWER WITHOUT MANUAL SHIFTING?	DOES IT HAVE A SPECIAL PICK-UP GEAR?	DOES IT ALWAYS REMAIN IN GEAR WITH NO FREE WHEELING?
HYDRA-MATIC DRIVE	YES	YES	YES	YES	YES	YES
DEVICE "A"	NO	NO	NO	NO	NO	YES
DEVICE "B"	NO	NO	NO	NO	YES	NO
DEVICE "C"	NO	NO	NO	NO	NO	NO
DEVICE "D"	NO	Optional	NO	NO	NO	NO
DEVICE "E"	NO	Optional	NO	NO	NO	NO

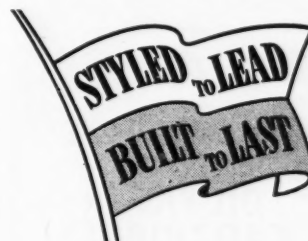


NO CLUTCH HYDRA-MATIC DRIVE

THE GREATEST PROSPECT MAGNET A DEALER EVER HAD !

FOR years, it's been an adage of the industry that "If you can get 'em in the car, you'll get your share of sales!" Now, Oldsmobile dealers have a sure-fire method of getting demonstrations. All they need to do is say "How'd you like to try Hydra-Matic Drive?"—and next thing they know, the prospect is behind the wheel. And once prospects find out how easy it is to drive without a clutch pedal to push, or gears to shift—once they

thrill to the stepped-up performance Hydra-Matic gives them—once they learn about Hydra-Matic's safety and economy advantages—they're easily sold! Just look at the chart above and see how much more Hydra-Matic does than any other drive. Then, write to D. E. Ralston, General Sales Manager, Oldsmobile Division, Lansing, Michigan, for complete information on the best franchise in the business.



THE CAR
Ahead!
IT'S

OLDSMOBILE

Bear Expansion Planned

Because of a 225 per cent increase in total volume of business during the past five years, the Bear Mfg. Co., Rock Island, Ill., makers of wheel alignment and safety testing equipment, has announced plans for an expansion program to start in 1941 which will double and possibly triple present production capacity.

Workmen will soon begin construction of a large addition to the main building of the plant near the business district of Rock Island. The addition will be a two-story structure and will contain main offices, as well as con-

siderably more manufacturing space.

The plant and factory school, for training of Bear equipment operators from all parts of the United States and points as distant as India and Hawaii, is now housed in three buildings. A fourth building across the street from the new addition also is contemplated.

According to Will Dammann, president and founder of the company in 1912, the Bear Mfg. Co. might be termed "a depression industry." It has had its greatest expansion during depression years, he said. "Our total volume of sales today is four times what it was in 1929."

A.M.A. Cancels National Show; Dealers Undecided

(Continued from page 51)

month. While the association made no statement regarding its discussions, it is understood that the matter is entirely in the hands of local dealer associations to hold or not to hold local automobile show. Chicago Automobile Trade Assn. has already announced that it will again sponsor the Chicago show. New York dealers, who, rumor said, may take over the sponsorship of the New York show as they did on one or two occasions in the past decade, have made no decision on the matter. Harry Bragg, manager of the Automobile Merchants of New York, said at press time, that dealers in the metropolitan area have not had time to discuss the possibilities of holding a show but would study the matter and reach some decision a little later. Detroit dealers have deferred announcement regarding their show.

Early announcements of 1942 models would undoubtedly affect the decision of dealers to sponsor shows. Without aid of manufacturers, and with new models on the street and in the dealer showrooms many weeks before show time, the drawing power of automobile shows would be seriously affected, some dealers point out.

Industry Geared

(Continued from page 50)

Spokesmen for two of the largest mass producers of motor cars voiced the opinion that they look for no curtailment of passenger car production through 1941, due to National Defense priorities on manpower or raw materials.

January production in the motor car industry set a new record for the month of an estimated 505,000 vehicles, topping the previous mark of 449,492 set in January 1940 by a substantial margin.

Retail sales in the United States during 1940 were the third largest in the last 10 years, exceeded only by 1936 and 1937. The total was 4,094,354 vehicles, a gain of 26 per cent over 1939, according to the AMA. Buick, Plymouth, Pontiac, DeSoto and Olds all set new all-time records for retail sales, while Chevrolet's consumer deliveries were exceeded only by 1936, and Studebaker enjoyed its best year since 1928. General Motors produced 2,025,343 vehicles during 1940, while Ford turned out 1,005,494 units.

Passenger car sales of 3,461,791 units were 27 per cent higher than 1939, while commercial car sales of 632,563 units showed a 22 per cent advance. December retail deliveries of 378,107 cars and trucks were the second highest on record, and 20 per cent greater than December of 1939.

This new merchandising idea by PICK will make profitable sales for YOU



have exceptional eye-appeal which stimulates sales

For 1941 Pick sets the pace with three sales-producing display assortments of Pick Replacement Cartridges.

Each of the oil filter cartridges furnished with these assortments is wrapped with colored moisture-proof transparent cellophane. This method of packaging adds to attractiveness . . . Shows entire contents of package . . . Keeps cartridge and small parts together so that none get lost . . . Protects contents of package from dust and moisture . . . and keeps stock looking fresh and saleable.

Attractive Display Stand (illustrated) is furnished FREE with initial order for Cartridge Assortment No. 2 or No. 3 . . . A larger display is included with Assortment No. 1.

Confer with your Pick jobber or write us for details, not only on Pick Replacement Filters, but also on Oil Filters for all makes of cars, trucks, buses, and tractors.

PICK MANUFACTURING COMPANY
WEST BEND, WISCONSIN



These are the Products

WHICH CARRY NAPA'S ASSURANCE OF QUALITY

ALLIED-A P C

Nukrome Valves, Valve Guides, Pin and Boss Bushings

ALLIED-PRECISION

Piston Pins

ALLIED-RAYMOND

Valve Springs and Keys

ALLIED-WISCONSIN

Pistons, Cylinder Sleeves

AMERICAN BRAKEBLOK

Brake Lining, Clutch Facings, Fan Belts, Radiator Hose

BALKAMP

Parts for Ford, Chevrolet and Plymouth. Tie-Rod Ends, Shackles, etc.

BELDEN

Spark Plug Wire and Sets, Primary Wire and Looms, Battery Cables, Cordlites and Soldering Irons

BROWN-LIPE

Transmissions and Clutches

BUFFALO—Mufflers and Tail Pipes

CELORON—Timing Gears

DETROIT—Universal Joints

DITTMER—Transmission Gears, Shafts, and Small Parts

DOUBLE DIAMOND

Drive and Pinion Gears, Flywheel Gears, Axle Shafts, Differential Parts

DUCKWORTH—Timing Chains

ECHLIN

Ignition Parts, Coils, Testing Instruments, Electrical Bushings, Oil Pump and Igniter Gears

FEDERAL—Ball Bearings

GRAPHO

Water Pumps and Parts, Packing

MARTIN-SENOUR

Spraying Lacquers, Synthetic Enamels, Painter Specialties, Thinners, Reducers

MONMOUTH

Clutch Plates and Parts, Engine Bearings, King Bolt Sets

NEW BRITAIN—Automotive Hand Tools

PURITAN

Hydraulic Brake Fluid, Shock and Knee-Action Oil

RARITAN—Roller Bearings

SPICER—Universal Joints

STANDARD

Oil Seals and Grease Retainers, Gear Adjustment Shims

TRICO

Vacuum-Operated Safety Products

UNITED

Hydraulic Brake Parts, Brake Cables, Fuel Pump Parts, Speedometer Cables and Parts

—AND OTHER PARTS AND MATERIALS



"I'm Getting the Best Parts Service I've Ever Had"

When NAPA started using this seal to identify the products it distributes, I woke up to the fact that I'd been missing a bet. I didn't realize until then the one-quality standard maintained by NAPA, or how comprehensive their service really is! . . . Now, I'm concentrating all my buying with the NAPA jobber here—and I'm getting the best, and fastest, and most convenient parts service I've ever had. //

Service men everywhere are making NAPA jobbers their source of supply because they know the NAPA Seal identifies only parts of highest quality. Complete factory stocks of more than 50 non-duplicating lines maintained in NAPA's 38 independently owned ware-

houses, assure faster and more complete service, even on seldom-needed parts.

If you are not already using NAPA products and NAPA jobber service, look up your nearest NAPA jobber. He can help you do business more easily and more profitably.

NATIONAL AUTOMOTIVE PARTS ASSOCIATION

Executive Offices: 705 Fox Building, Detroit

NATION-WIDE ORGANIZATION OF INDEPENDENT WAREHOUSING DISTRIBUTORS

It pays to Buy the Best!

MANCINI AND HIS \$3000

Ugo Mancini, De Soto dealer at Mountain View, a town of 2500 population near San Francisco, staged a remarkable series of "deals" which resulted in his acquiring not only a fine new business location but the greater part of the materials for a strikingly modern business establishment—at no cost to himself whatever.

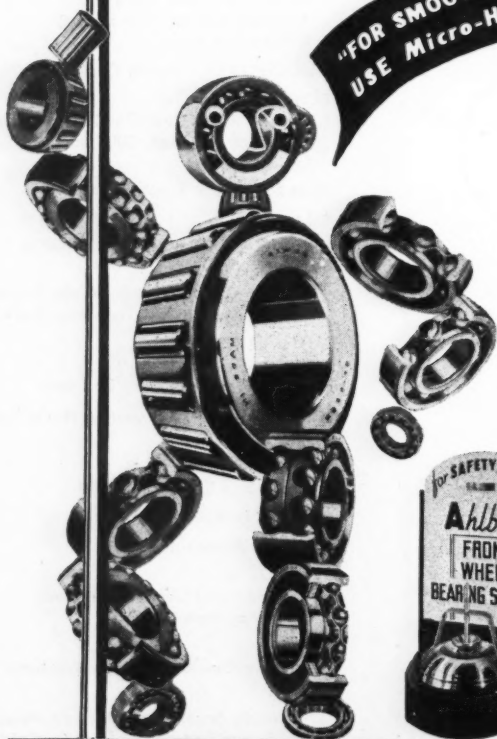
It all started at the World's Fair on Treasure Island in San Francisco Bay. It was literally "love at first sight" when Mancini first beheld the



INSURE the easy, quiet performance of original equipment by replacing rough bearings with Bower Tapered Roller Bearings . . . "Micro-Honed" to 3 micro-inches for finer adjustment and greater load-carrying capacity.

Two-zone contact of roll ends with high flange, unsurpassed smoothness of surface finish and other exclusive Bower features put a stop to bearing troubles, eliminate "run-in" and guarantee your good work.

**"FOR SMOOTH PERFORMANCE, LONGER WEARING,
USE Micro-Honed BOWER ROLLER BEARINGS"**



Bower "Micro-Honed" Tapered Roller Bearings are an important part of your Ahlberg Jobber's unique "All-Bearing" service. Call him for prompt supply.

**Ahlberg
JUNIOR
Front Wheel
Bearing Service
Salesman**

for counter, bench or wall. Carries advertising, small tested stock, genuine Croft knock-out tool and Croft packer.



Ahlberg Bearing Company

Manufacturers of CJB Master Ball Bearings
3028 WEST 47TH STREET — CHICAGO — 30 WAREHOUSE BRANCHES
Out West it's PRECISION BEARINGS, INC. Los Angeles

towers and pylons and other architectural features of the Chrysler Corporation exhibit at the Fair.

So he made an offer to buy the exhibit when the Fair was closed—for \$3,000. His offer was accepted.

Then, when the time came to dismantle the fair buildings, Mancini arrived on the scene and began sorting out the materials. In one pile, he placed the towers and pylons and other parts he wanted to keep. In another pile, he neatly stacked the things he didn't want.

And then he sold the latter pile—for \$3,000!

Next, he used the \$3,000—his original dough—to buy a choice piece of land in Mountain View which for some time had appealed to him as an excellent business location.

Then, he immediately got his \$3,000 back, for he sold a corner of his new land to an oil company desiring a new service station site—for exactly that amount!

On his share of the land, which had cost him nothing, Mancini erected a new dealer establishment, his whole building theme centering around the towers and pylons that once graced the Fair building on Treasure Island. Atop the tower at the main entrance to his new car salon is a huge globe of the world which revolves slowly on its axis and is floodlighted at night.

Mancini is said to sell most of the new automobiles that are sold in his home town of Mountain View. He probably does!

D. M. Allgood Promoted

A change in executive personnel has been announced by C. E. Murray, vice-president and general manager of the Willard Storage Battery Co., which places D. M. Allgood in the position of director of merchandising, succeeding S. E. Baldwin, veteran of the Willard organization, who assumes the position of manager of public relations.



D. M. Allgood



NEW ROW CROP TRACTOR

This is Oliver's new Row Crop 60, 2-row 1/2 plow tractor. Designed for comfort, it has adjustable, upholstered seat with form-fitting back rest. Seat is fitted high up so the operator has good visibility. Equipped with the "PowerMaster" 120.6 cu. in., four-cylinder, high compression engine.

American Brakeblok Sales Organization Meets

P. B. Hoffman, general sales manager of American Brakeblok, announced marked 1940 sales increases for all automotive brake materials and other products sold by this division of The American Brake Shoe and Foundry Co. in the replacement field, at a meeting of the division's nationwide selling organization held in Detroit last month.

New sales plans and products were announced at this meeting by C. Q. Smith, replacement sales manager, and by P. J. Kelly, assistant replacement sales manager.

American Brakeblok enters 1941 with a new program of engineering advisory service and specialized brake materials for varied types of heavy-duty vehicles. New lines of fractional horsepower belts and automotive universal joint discs were announced by Smith and by H. Seith, contact sales manager.

Hoffman presented 1941 advertising and sales promotion plans and introduced C. C. Wilmot and other executives of the division's newly appointed advertising agency, Brooke, Smith, French & Dorrance, Inc.

American Brakeblok will substantially increase its Detroit manufacturing capacity with a plant now under construction and scheduled for early completion.

Magnus Appointments

Magnus Chemical Co., Inc., Garwood, N. J., manufacturers of cleaning materials, industrial soaps, metallic soaps, emulsifying agents and metal working lubricants, announces four appointments as follows: Paul Blanchard as sales representative in Scranton, Pa., and vicinity; Henry W. Scott becomes resident sales representative in southeastern Florida; Walter E. Winship will represent Magnus in the State of Louisiana and southeastern Mississippi; J. H. Welch as sales representative in Arkansas and the western part of Tennessee.

THEY'RE like safety washers on your good work — perfect bearings in place of worn ones turn out a tight, well-lined-up, quiet-running job.

This kind of bearing service — the kind Ahlberg provides — pays! You deal with your Ahlberg Jobber who has exactly what you need when you need it; you get the right replacement promptly; you install it — and customer satisfaction is assured!

**"MAKE YOUR BEARINGS SERVICE PAY...
REPLACE THEM ALL THE AHLBERG WAY"**

Get every ball, roller and thrust bearing you need from your Ahlberg Jobber, one of 800 Wholesalers served by the Ahlberg Factory and 31 Factory Branch Warehouses.

**Ahlberg
SENIOR
Front Wheel
Bearing Service
Salesman
WASHES
DRIES
RE-PACKS
STORES STOCK**

Turns dirty work into a clean profit. Attracts service and replacement business through fast factory-type job.



Ahlberg Bearing Company

Manufacturers of CJB Master Ball Bearings

3028 WEST 47th STREET — CHICAGO — 30 WAREHOUSE BRANCHES

Out West at PRECISION BEARINGS, INC. Los Angeles

BODY MAINTENANCE

(Continued from page 24)

Rear Door Remote Control Removal

Remove finish molding, remote control and window regulator handles and door trim panels. Then drill out rivet 2, Figs. 14 and 15, or remove complete assembly, including remote control link and lock. To reinstall reverse the procedure.

Elongated holes are for adjustment. If door lock does not release with window down and door closed, remote control must be moved away from door lock.

Door Lock

Fig. 16. 1, Lock mechanism; 2, Lock cams and springs; 3, Rivet-Link to Lock; 4, Link; 5, Coil spring; 6, Locking device; 7, Rotor; 8, Female dovetail.

Door Lock Lubrication

Lubricate both sides of striker and rotor 1, Fig. 17, with stainless lubricant. Lubricate cams 3, and lock mechanism with light motor oil.

Rear Door Door Lock Removal

Remove rubber pushbutton, finish molding, remote control control handle, regulator handle, trim panel, door

felt molding, door outside handle. Then raise door glass and remove screw holding side glass channel to door lock post at bottom. Remove screws holding remote control to door. Remove screws holding lock to door. Push lock to inside of door and lower below glass channel retainer, removing through opening in door inner panel, Figs. 18 and 19. To install reverse the procedure, using a piece of tubing to guide push rod up through opening in door inner panel edge, Fig. 20.

Front Door Ventilator Removal

Remove finish molding and ventilator handle. Loosen hinge side of door trim panel. Remove the two screws, 6, Fig. 21, and screw 7 and two screws, 8. Then lower ventilator control until disengaged from glass frame shaft and remove from door.

Ventilator Glass Removal

Clamp bottom pivot in vise. Then protect glass with two blocks of wood and by means of a C-clamp tightened on wood blocks, glass can be withdrawn, Fig. 22.

Ventilator Adjustment

If tightening screw 10, Fig. 21, does not overcome excessive looseness of glass, remove control unit and with a hack saw cut a slot in each end of the box section, Fig. 23.

Ventilator Channel Removal

Remove finish molding, remote control handle, window regulator handle, ventilator handle, arm rest, and trim panel. Remove screws 2, Fig. 24, holding center channel to door header and screws holding glass channel 3 to top of door inner panel, also glass center channel support stud 5 and adjusting nut 4. Then list center channel 1 from door.

Ventilator Channel Adjustment

Adjust support stud 2, Fig. 25, so that glass will travel straight up and down without binding in the channel. An elongated hole is provided in door inner panel whereby channel may be adjusted against edge of glass. Use powdered graphite for lubricant.

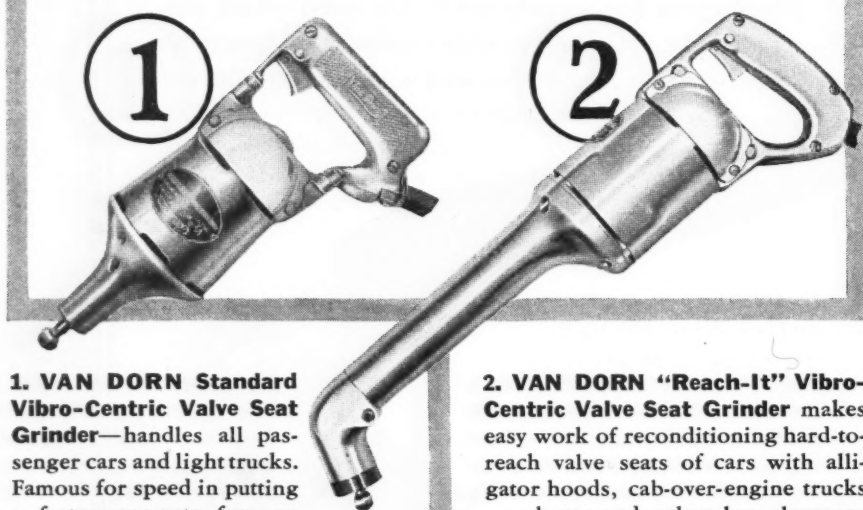
Sedan Front Door Window Regulator Removal

Remove finish molding, remote control handle, window regulator handle, ventilator handle, arm rest, and trim panel. Raise the door glass and remove the screws 2, Fig. 26, holding the glass up through cut-out in door panel. Lower the glass, allowing regulator to slide in glass bottom channel. Disengage regulator arm from glass bottom channel. Push glass up enough to clear movement of regulator arm so that it may be taken from door through cut-out in door inner panel, Fig. 27.

Coupe Window Regulator Removal

Remove finish molding, remote control handle, window regulator handle, (Continued on page 123)

2 WAYS to Make More Money by Faster VALVE SEAT GRINDING



1. VAN DORN Standard Vibro-Centric Valve Seat Grinder—handles all passenger cars and light trucks. Famous for speed in putting a factory-accurate face on valve seats. Exclusive, Vibro-Centric vibrating action lifts grinding stone each revolution to prevent "loading." A dandy Grinder for moving jobs out of average shops. Special angle drive attachment for grinding "way back" valve seats available for this model.

2. VAN DORN "Reach-It" Vibro-Centric Valve Seat Grinder makes easy work of reconditioning hard-to-reach valve seats of cars with alligator hoods, cab-over-engine trucks . . . buses and other low-clearance jobs. Extra long spindle and 70° angle head reach seats in most difficult spots. The Van Dorn "Reach-It" Vibro-Centric Valve Seat Grinder has extra power and speed to perform precision grinding under adverse conditions that stump the average Grinder.

Ask your jobber to "fit" one of the Complete line of VAN DORN Vibro-Centric Valve Seat Grinders to your shop, enabling you to turn out jobs faster, more accurately, with more profit—or write Van Dorn Electric Tools, 727 Joppa Road, Towson, Md.

"Van Dorn"

(DIV. OF BLACK & DECKER MFG. CO.)

THE "RED HEADED" PORTABLE ELECTRIC TOOLS

TWO-SPEED REAR AXLES

(Continued from page 34)

from the double reduction shaft bearing caps and remove the caps and shims. NOTE—A short bar can be used between the back of the ring gear and the carrier to aid in removing the left bearing cap which is piloted to the carrier.

The double reduction shaft assembly can now be removed from the carrier by sliding it to the left side of the carrier and pulling the ring gear towards the rear and threading the assembly past the differential bearing supports. (Fig. 4) Then remove the shifter yoke. The right-hand bearing outer race can be removed from the carrier with a soft drift punch and hammer. This completes the third member disassembly.

Propeller Shaft and Pinion — Disassembly

Chip off the propeller shaft coupling rivets with a cold chisel and drive out the rivets. Install the coupling press and pull the pinion from the coupling by threading the shaft through the steel block which is set in the vise. Place the steel wedges around the shaft in the block and press the adapter against the pinion bearing retaining nut. By turning the nuts on the puller against the adapter, the pinion is separated from the coupling. Raise the edge of the pinion bearing lock nut and remove the lock nuts and thrustwasher. Then press the pinion shaft out of its bearings in an arbor press.

Reassembly

Lubricate the bearing roller races. Install the pinion with the rear bearing roller race in the pinion cage. Then press the front bearing roller race assembly on the pinion shaft until a slight "drag" is felt when turning the pinion cage.

Place the pinion gear in a vise equipped with copper jaws to protect the teeth. Install the thrustwasher, bearing nut, lock plate, and lock nut. Adjust the bearing until all end-play is removed and the pinion cage can be turned with a very slight "drag," then tighten the lock nut. Lock the pinion bearing nuts by bending one tang of the lock plate over the adjusting nut and another over the lock nut.

Start the propeller shaft coupling on the pinion shaft spline until the rivet hole in the coupling registers with the hole in the pinion shaft and install the rivet. Then start the propeller shaft into the coupling. Install the propeller shaft coupling press and press the propeller shaft into the coupling until the rivet holes line up. Remove the press and install the rivet. NOTE—When assembling the pinion press to the propeller shaft for replacing the coupling, it is necessary to turn the steel block over so the

taper wedges will be installed from the pinion end.

Double Reduction Shaft Assembly — Disassembly

Remove the lock rings from the bearing nuts. The nut at the end opposite the ring gear should be removed first, to permit removal of the bearing, low-speed reduction gear, shifter sleeve, and detent balls and springs. Then clamp the gear machined on the double reduction shaft

in a vise equipped with copper jaws to protect the teeth, and remove the bearing nut from the ring gear end of the shaft.

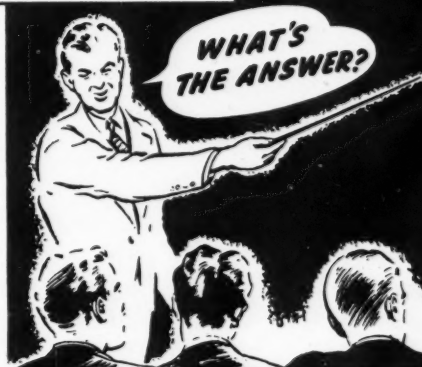
Replace the shifter sleeve on the shaft, allowing it to bear against the high-speed pinion. With the assembly resting on the shifter sleeve supported in an arbor press, press the bearing and ring gear from the shaft. (Fig. 6.)

Reassembly

Before assembling the double reduction pinions to the shaft, their inner bearing surfaces must be thoroughly lubricated with light grease for initial

PRACTICAL SHOP PROBLEMS No. 1

WHEN TESTER SHOWS COIL TO HAVE:



A low secondary output... or
A high primary draw... or
An open primary circuit... or
A shorted or tracked top

INSTALL A NEW COIL

But Be Sure It's a NIEHOFF HIGH QUALITY COIL

Give your customers EXTRA performance... build good will and extra profits... recommend NIEHOFF QUALITY COILS. They deliver full power under the best as well as the worst driving conditions, and with minimum battery drain. Their generous reserve power provides quicker starting in all temperatures, smoother operation and greater fuel economy. Leading Jobbers everywhere have a complete stock for immediate delivery.

Ask your Jobber's salesman or write us direct.

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giving you complete details with reference to "Practical Shop Problems No. 1," will be sent to you if requested on your BUSINESS LETTERHEAD. Write today.



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ADDRESS

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lubrication. Install the high-speed double reduction pinion on the shaft and start the ring gear on the splines. Then press the ring gear tightly on the shaft. (Fig. 8.) Start the bearing on the shaft and place the outer race over it. Then support the outer race and press the bearing solidly against the ring gear.

Place the gear machined on the shaft in a vise equipped with copper jaws. Install the bearing retaining nut and tighten it tight. The nut must be in a locking position.

The shifter sleeve has three tapered teeth in each side which work in con-

nection with the shifter lock balls in the shaft, and must line up with the springs and balls in the shaft.

The tapered teeth in the shifter sleeve are unevenly spaced. Find the location for assembly by counting the number of teeth between the holes in the shaft and between the tapered teeth in the sleeve. The nine tooth spacings must go together. (Fig. 9.) NOTE—The tapered side of the clutch sleeve must be toward the ring gear.

Install the springs and balls in the holes in the shaft. (Fig. 10.) Compress the balls and install the shifter sleeve with its tapered side towards

the high-speed pinion.

Assemble the low-speed double reduction gear to the shaft. Press the bearing on the taper, install its retaining nut and tighten it down until the clearance between the pinion and the bearing inner race is from .012" to .015". Lock the nuts by installing the lock rings. (Fig. 11.)

Differential — Disassembly

Remove the lock wire and bolts from the differential case. Then remove the cover, high-speed double reduction gear, spider, pinions and the side gears. NOTE—The low-speed double reduction gear is riveted to the case and will be serviced as a unit with the case. The high-speed double reduction gear will be serviced separately.

Reassembly

Lubricate the thrustwashers, side gear hubs and pinions. Then install them in the differential case and cover. Install the high-speed double reduction gear on its pilot on the differential case with the flat side of the gear towards the case. Then install the cover, making sure to mate the "X" marks on the Case and Cover. (Fig. 13.) Install four bolts evenly spaced and pull them down "snug" to aid in alignment. Install the balance of the bolts and pull them down tight and lock the nuts with tie wire. The three major units of the 2-speed axle assembly are now ready for reassembly in the third member carrier.

Third Member-Reassembly

Install the shifter yoke and thread the double reduction shaft past the differential bearing supports and through the opening in the housing for the left bearing, at the same time fitting the shifter yoke to the groove in the shifter sleeve. Install the bearing outer race in the right side of the third member carrier and tap it in flush with the carrier.

Install a new gasket on each side, and then install the same number and thickness of shims that were removed when disassembling, making sure the cut-out in the gasket and shims line up with the lubrication openings in the housing. (Fig. 14.)

Assemble the bearing caps, being careful to line up the lubrication openings in the cap with those in the carrier. Install three lockwashers and nuts on each cap, evenly spaced, and tighten them securely.

Install the shifter yoke shaft bushing over the shaft and tap it into the carrier. Then install the cork seal in the top of the bushing. Assemble the shift lock spring and pawl. Install the Woodruff key in the shaft, shift lever, shakeproof lockwasher and nut. Tighten the nut securely.

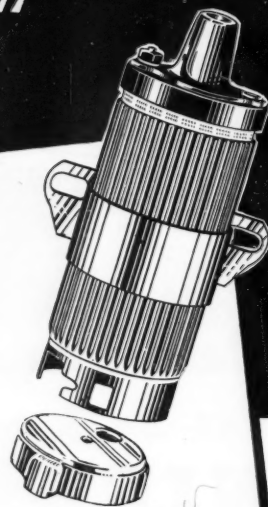
Check the bearing adjustment. Correct adjustment of the double reduction gear is essential for proper operation. (Continued on page 98)

"MORE CUSTOMERS EVERY MONTH FOR SUPER POWER COILS"

— So Say America's Best Mechanics

P. & D. patented Super Power Air Cooled Coils are made to meet replacement needs of modern high compression motors.

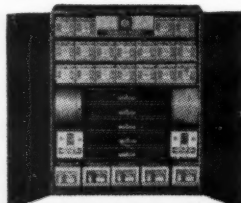
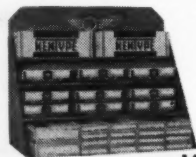
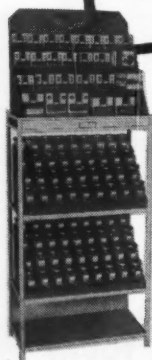
A spare adapter with each coil makes them practically universal and keeps stock moving.



Ask your P. & D. Jobber about

the DU-1, the new Merchandiser that has Everything. Select your own combination of parts from 4 interchangeable units. P. & D. Lock Type cabinets, preferred by many, contain up-to-the-minute assortments that will service 90% of all cars on the road.

Write for particulars



P. & D. MANUFACTURING COMPANY, Inc.

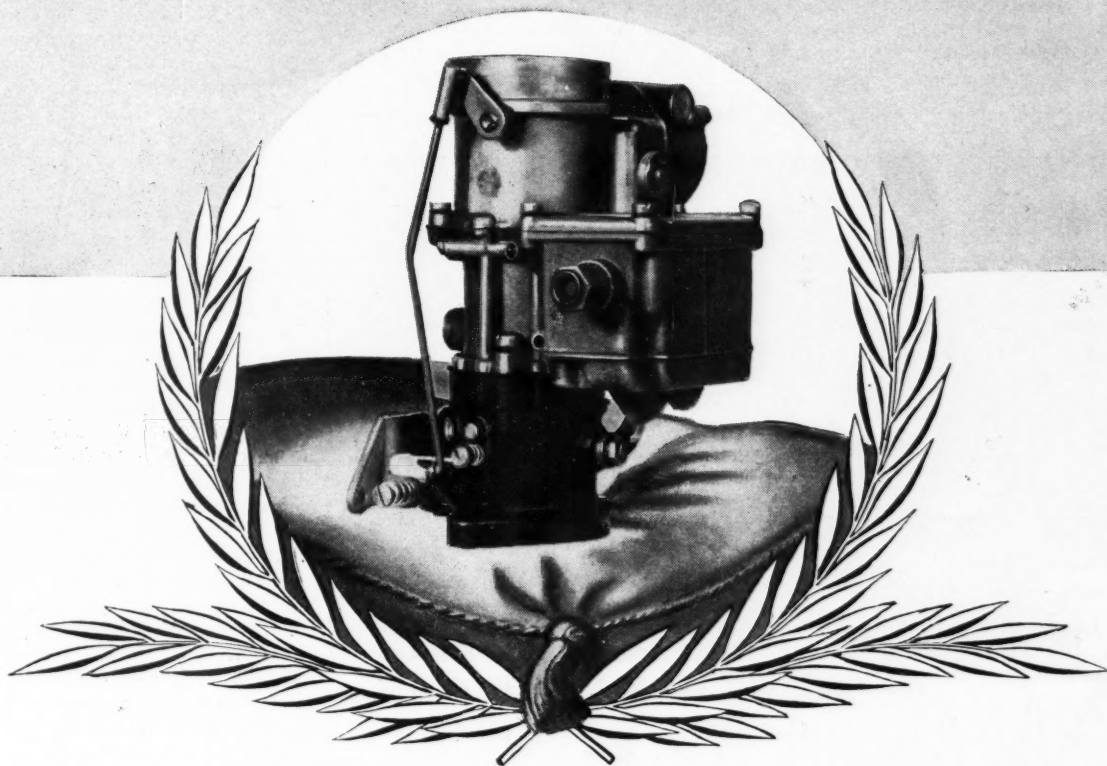
STARTING
LIGHTING
IGNITION

LONG ISLAND CITY
NEW YORK

REPLACEMENT PARTS

P. & D. Manufactures ONE complete quality line. Only the finest materials and workmanship obtainable are employed.
YOU CAN NOT PURCHASE ANY FINER QUALITY

BETTER CARBURETION buys *Lasting Good Will*



ENDURING good will is obviously *the* big essential in creating repeat sales of any car. Certainly insofar as carburetion is concerned (which is plenty!), a man is far less inclined to switch to another make of car if the car he's been driving has retained its "good behaviour" up to the time he's ready to trade.

The fact that the Stromberg Carburetor keeps its new-car standards of efficiency for an exceptionally long time is well known. This is reflected in the universal high regard in which Stromberg is held—

not only by engineers and by service men, but by the motoring public.

This good reputation has been sustained throughout the years . . . years in which Stromberg has been repeatedly and consistently first with fundamental advancements in the science of carburetion. Drivers, owners, service mechanics, salesmen and dealers *know* that Stromberg delivers *lasting* good performance.

BENDIX PRODUCTS DIVISION
of Bendix Aviation Corporation • South Bend, Indiana

Bendix Builds Better Carburetion
**The STROMBERG
CARBURETOR**

REAR AXLES

(Continued from page 96)

tion shaft bearings will produce a slight "drag" when it is turned by hand. Bearing adjustment is secured by the use of shims of .003" and .005" thickness.

Assemble a new pinion cage gasket and the same number and thickness of shims that were removed when disassembling. Be careful to line up the oil holes. Assemble the propeller shaft and pinion cage assembly to the third member carrier with the lubrication fitting in the cage to the top right side, being careful to line up the oil

holes. (Fig. 15.) Install three lock-washers and nuts evenly spaced and tighten them securely.

Adjustment

Paint the ring gear with red lead, or coat it lightly with prussian blue. Turn the propeller shaft first in one direction and then the other, at the same time applying pressure on the back of the ring gear to bring a load on the gears. Then check the tooth bearing on the ring gear for pinion depth. If the pinion is too deep the tooth bearing will be below the Pitch Line. If it is too shallow, the bearing will be above the Pitch Line.

To make pinion depth adjustment, remove the pinion cage and add shims if the pinion is too deep or remove shims if the pinion is too shallow.

Excessive backlash between the ring gear and pinion moves the tooth bearing towards the heel of the tooth, while insufficient backlash moves the tooth bearing towards the toe of the tooth.

To check the backlash use a dial indicator on the heel of a ring gear tooth. Correct backlash is from .006" to .012". (Fig. 16.) To adjust the backlash proceed as follows: if insufficient backlash—remove the double reduction shaft bearing caps and remove a shim from the left side and add a shim of the same thickness to the right side. If the backlash is excessive—remove a shim from the right side and add a shim of the same thickness to the left side. Continue these adjustments until the backlash is within limits.

To check the movement of the shifter collar, move the shifter lever to the high-speed position and check the clearance between the shifter sleeve and the high-speed pinion. This should be from .015" to .025". (Fig. 17.) Make a similar check with the shifter lever in the low-speed position.

Any necessary adjustments can be made by turning the shifter lever stop pins, which are eccentric, with a large pair of pliers. Lubricate the differential bearings, assemble the outer races, and install the assembly in the carrier. Then assemble the adjusting nuts and caps, using the cap screws as a guide to line up the adjusting nuts. Make sure the cap and adjusting nuts are installed according to the center punch marks made when disassembling. Tighten the bearing cap bolts just "snug."

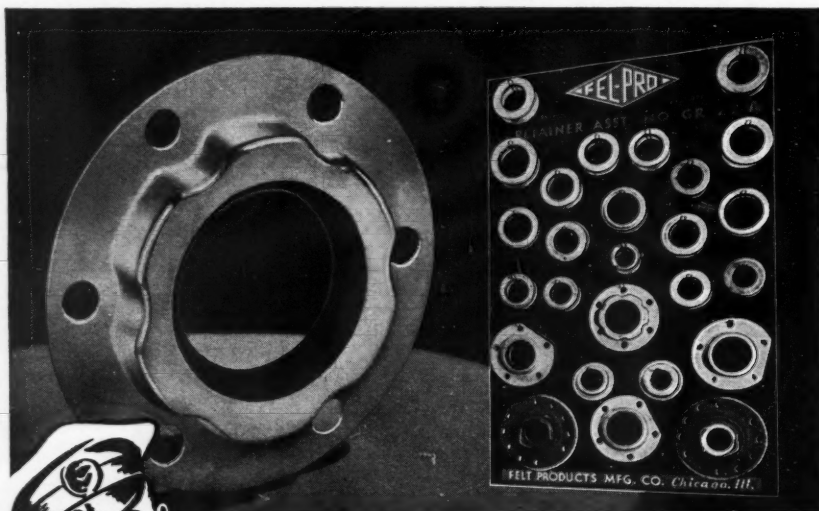
Check the position of the double reduction gears with the double reduction pinions. Move the differential by the adjusting nuts until the double reduction gears line up with the double reduction pinions. Adjust the bearings by pulling the adjusting nut up tight, then backing it off one notch.

Tighten the bearing cap bolts tight and install the adjusting nut locks and then lock all bolts with tie wire.

Lubricate the front propeller shaft bushing and oil seal, and install the torque tube, using a new gasket between the housings. Install the third member assembly in the banjo housing, using a new gasket between the housings. Remove the pipe plug in the pinion cage and with a lubricating gun, fill the space between the bearings with one pint of lubricant. (Fig. 18.) NOTE—It will not be necessary for any further lubrication at this point while the truck is in service.

Assemble the axle shafts using new gaskets. Install the lock sleeves on the bolts. Then assemble the lock-washers and nuts, tightening them

(Continued on page 100)



HERE'S HOW TO STOP BRAKE SERVICE COMEBACKS!

• Brake service jobs that have to be done over because of grease on the linings cost you far more than time and labor! A single "come-back" on brake linings can kill the profits on half a dozen other service jobs... costs an extra set of brake linings... causes customer complaints, dissatisfaction and possible business loss.

By using Fel-Pro Grease Retainers on every brake job you eliminate these problems and get extra profits for your work! Engineered to the same high standards as Fel-Pro Gaskets, which are used by leading car manufacturers, Fel-Pro Grease Retainers are made in sizes and types to fit all cars. Simple catalog listing makes them easy to order! See your jobber today or write FELT PRODUCTS MFG CO., 1510 W. Carroll Ave., Chicago, Ill.

Send For Grease Retainer Catalog Now!





Packard REG. U.S. PAT. OFF. TRADE MARK CERTIFIED RE-WIRING SERVICE

INVESTMENT SMALL. The only investment you make to become a Packard Certified Re-Wiring station is in a few simple *checking tools* for your mechanics, and a nominal stock of the Packard cable you will need in providing Certified Re-Wiring Service. Packard supplies the rest—service instructions, sales information, sales helps and signs.

RETURNS BIG. Packard Certified Re-Wiring Service steps up your cable sales because it gives your mechanics the *tools and instructions* they want, to find defective cables and connections quickly and simply. *But it does more than that.* The same checking procedure that uncovers defective cables *also* brings to light defective electrical units. You boost your replacement sales and repairs on headlamps, batteries, distributors, coils, starting motors, generators, etc.

BETTER SERVICE. Since the performance of all electrical units demands good wiring and connections, your tune-up jobs and electrical service work are better quality when your mechanics

have what it takes to put the wiring system in A-1 condition.

BULLETIN SERVICE—FOR CERTIFIED RE-WIRING STATIONS ONLY. Service bulletins, giving latest specifications and sales and service ideas, are mailed regularly to Packard Certified Re-Wiring stations only. The service information they contain is something your mechanics will use every day; the sales information has real value for you.

SEE YOUR PACKARD JOBBER. He'll tell you how simple it is to become a Packard Certified Re-Wiring station, and give you information on such optional merchandisers as the Packard Workbench Display, illustrated above. Packard Electric Division, General Motors Corporation, Warren, Ohio.

Packard REG. U.S. PAT. OFF. TRADE MARK

THE STANDARD WIRING EQUIPMENT OF THE AUTOMOTIVE INDUSTRY

REAR AXLES

(Continued from page 98)

securely. Complete the reassembly by connecting the propeller shaft with the rear universal joint. Lubricate the universal joint and fill the rear axle housing with 13½ pints of S.A.E. 90 gear lubricant.

Shifter Mechanism and Adjustments

In assembling the shifter mechanism to the torque tube, it is most important that the stamped dowell in the brackets be located in the depressions in the torque tube. The shoulder

of the cable connectors must be firm against the brackets.

Installation

The installation of the control linkage on the various trucks varies somewhat due to the difference in wheelbase. However, the adjustments are the same on all units. Fig. 19 illustrates the installation. To install on the 133"-158½" wheelbase Conventional Trucks, install the two brackets on the torque tube, making sure they are located with the depressions in the torque tube. Assemble the cable to the cross member bracket and the front bracket on the torque tube. The

shoulders on the cable housing must rest against the brackets and the U-bolts in the grooves in the cable housing.

The front and rear pull rods may then be assembled and adjusted as follows:

Adjustments

1. Disconnect the front adjustable pull rod at the front end.
2. Disconnect the rear adjustable rod.
3. Check brackets and U-bolts on the torque tube and cross member to make sure they are in their proper position. The brackets are staked and the cable housings are grooved for the U-bolts.
4. Unscrew the front connector from the end of the cable and turn the lock on the cable so that it will be 11/16" from the end. Then replace the connector on the cable and tighten the lock nut. If necessary move the connector so that the front end is 2" from the front face of the front bracket. This will locate the complete cable and rod assemblies in their brackets.
5. Have the hand lever in the vertical position, or slightly forward position if necessary, to obtain at least 1" clearance between the lever and seat cushion. This may vary if the seat cushion is in the forward position.
6. Adjust the front adjustable pull rod so that the clevis pin can be installed. Then lock the nut at the connector.
7. With the shift lever on the differential case in the forward position or Low Ratio, make sure that the ball is in the detent. Then adjust the rear adjustable pull rod so that the clevis pin may be installed.
8. Shift the hand lever forward and check to make sure that the lever on the differential case is in the full rear position or High Ratio, with the ball in the detent.

The cable linkage is lubricated at the lubrication fittings in the connectors.

The 107½" wheelbase C.O.E. Trucks have one U-bolt and a bracket at the rear axle housing only. The hand lever is attached to the engine cover and is connected to the pull rod through an idler lever mounted on the sub-frame.

The 138½"-156½" wheelbase C.O.E. Truck installation is similar to the Conventional Trucks.

O. C. Holaday Made General Sales Manager of Ramco

Jack Ramsey, president of the Ramsey Accessories Mfg. Corp., has announced the appointment of O. C. Holaday as general sales manager of Ramco. Before joining Ramco more than a year ago, "O. C." was the directing head of the service department of The Bendix Corp. from which post he went directly to Ramco.

What do *You* consider the 3 most important Brake Fluid features?

In a recent survey conducted by Ross Federal Research Corporation among garages, car dealers, fleet owners and service stations, the following features topped the list:

FREEDOM FROM GUMMING

FREEDOM FROM RUBBER ACTION

MISCIBILITY WITH OTHER FLUIDS

Puritan First Choice!

If you, too, consider these three features the most important, Puritan Brake Fluid should be first choice for you. For Puritan has the *only* non-gumming base . . . Puritan has the least rubber action . . . Puritan is the *only* brake fluid completely miscible with *all* others!

Ask your jobber salesman for the complete Puritan story.



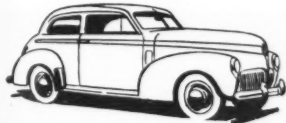
PURITAN COMPANY, INC.
ROCHESTER, NEW YORK



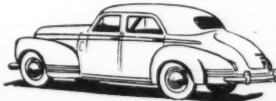
Deal yourself this winning hand for 1941

Four of a kind and all Aces!

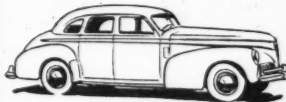
A
♠ 1—the most talked
of car in the lowest
price field—the one
and only Studebaker
Champion.



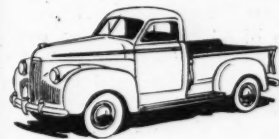
A
♣ 2—the toughest car
of medium price to
sell against in all
America—the Stude-
baker Commander.



A
♥ 3—the ultimate in lux-
ury at a limited price
—the superbly styled,
magnificently engi-
neered Studebaker
President Eight.



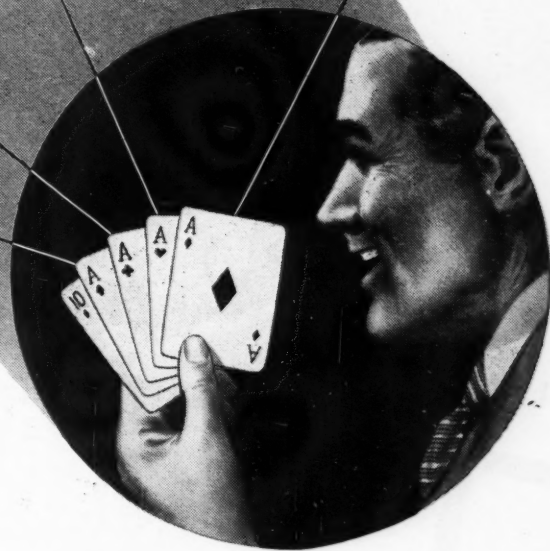
A
♦ 4—the sweetest set
up of low priced
commercial cars and
trucks that any pas-
senger car dealer
ever had to offer.



HERE'S a hand that always wins—a hand you've dreamed of getting ever since you became an automobile dealer — complete coverage of every prospect in your territory for a car or truck—backed up by the friendliest, liveliest factory in the business.

To get this winning Studebaker hand, you make *just one* investment—you pay *just one* overhead—you carry *just one* line of parts—you feature *just one* name—you do business with *just one* factory.

Deal yourself the cards, gentlemen. Write or wire at once for full details to Paul G. Hoffman, President, The Studebaker Corporation, South Bend, Indiana.

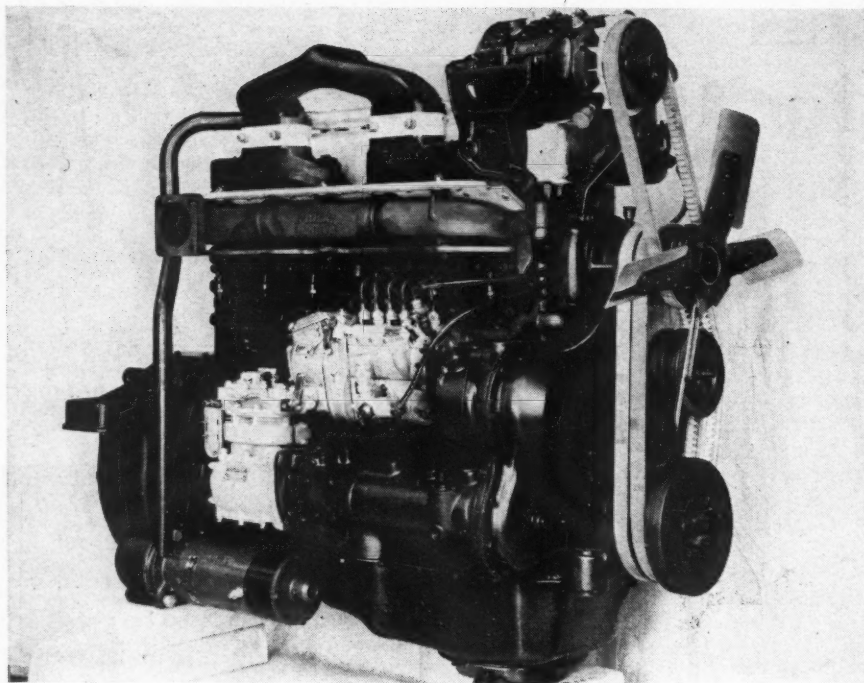


*New Studebaker dealer
reports tremendous
satisfaction with
Studebaker's new
"complete-coverage" line*



Detroit should be a tough town for a dealer selling South Bend cars and trucks. But it isn't for me. I've had other franchises but I've never been as happy—and as sure of real profits—as I am with the Studebaker line. "Complete coverage" is the reason—and how.

James M. "Pat" O'Dee



NEW MACK DIESEL A smaller edition of the Mack-Lanova diesel, model ED, this new model END-405 is designed for installation in four-wheel truck models of the 24,000-26,000 lb. gross vehicle weight range. It has a piston displacement of 405 cu. in. and bore and stroke of 4" x 5 $\frac{3}{8}$ ". Engine operates at the maximum governed speed of 2200 r.p.m. and develops 107 horsepower at that speed. Maximum torque at 1200 r.p.m. is 308 lb. ft. Exceptionally high power and economy is claimed at moderate compression and fuel injection pressure. Injection equipment consists of a Bosch multiple-unit injection pump. Removable dry cylinder sleeves used.

Reduces Headlight Glare

A new device known as Circlite has been announced by Circlite Company, 2975 Cottage Grove Ave., Chicago, Ill. It consists of a series of spiral vanes which clamp over the headlight bulb and are held in place by a spring. These vanes are said to reflect the light to both sides of the road as well as for the normal distance ahead of the car, and eliminate the blinding glare for the driver of the approaching car. It is also claimed to be effective in fog or rain. Price \$1.00 per pair.

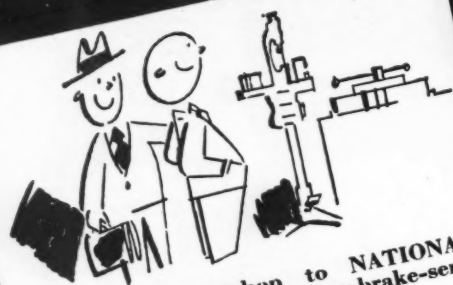
Black & Decker Annual Statement

The Black & Decker Mfg. Co.'s thirtieth annual statement as of Sept. 30, 1940, shows consolidated net sales of \$6,976,023.78 as compared to \$5,346,364.40 for the previous year, an increase of 30.48 per cent.

The net earnings for the year amounted to \$1,065,095.29, or earnings of approximately \$2.82 per share as compared with net earnings of \$1.60 per share for the previous year.

Dividends at the rate of \$1.25 per share were paid during the year as compared to \$1.00 per share for the previous year.

8 EASY STEPS TO MORE PROFITS



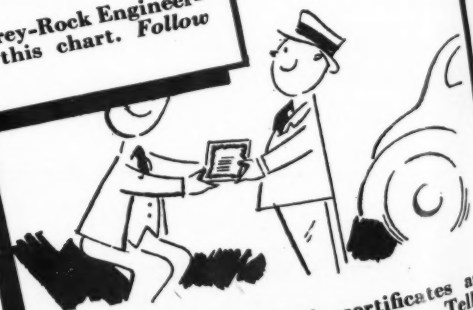
1. Pledge your shop to **NATIONAL SAFETY COUNCIL's*** new brake-service schedule. Get set for profits.



3. Show customers **Grey-Rock Engineering Methods**—in this chart. Follow this expert help.



2. Hang up your pledge. Live up to it. Read it to customers. Boast about it.



4. Give out **Grey-Rock** certificates as proof of brake jobs well done. Tells customers when to return.



*The hub of the Safety Movement in America which has reduced the number and severity of accidents for millions of people.

Grey-Rock

Alcohol Fuels Costly;

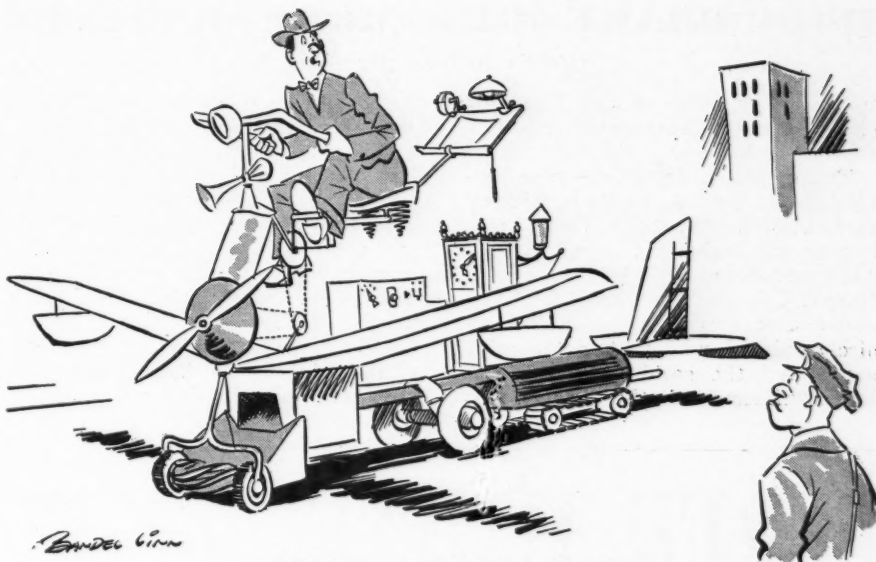
Use Far Off, Says Study

The use in gasoline of alcohol made from farm products is no more practicable today than at the beginning of its consideration 30 years ago, the Committee on Motor Fuels of the American Petroleum Institute concludes in a comprehensive new study, "Power Alcohol, History and Analysis," issued last month.

Finding that even cheaply priced farm products cannot be processed into alcohol for less than five to six times the cost of gasoline, the committee estimates that a mixture containing 10 per cent of alcohol would consistently cost around three cents a gallon more than straight gasoline.

"The claim that technical advantages of alcohol-gasoline fuels justify their extra cost is not supported by facts," the committee finds. "Use of a 10 per cent mixture would increase the nation's fuel bill by \$690,000,000."

The study states that in net effect the alcohol scheme would be against farm interests "because farmers buy one-fourth of the motor fuel consumed, because relatively few could actually sell products to alcohol distilleries, and because of adverse influence on sales of other products, on soil fertility, and on independent farming."



"Which way is the patent office?"

"Governmental encouragement of the scheme might lead to stock-jobbing promotions costly to investors or to socialistic experiments in state operations of distilleries," the committee declares. It also believes that the introduction of compulsory or subsidized fuels would invite serious disorganization of motor fuel marketing because of unprecedented new opportunities created for evasion of gasoline taxes, which unscrupulous mar-

keters could utilize in waging continuous price wars against honest marketers.

Pretensions that alcohol is needed as a substitute for irreplaceable oil supplies, the bulletin declares, are answered by the fact that petroleum reserves are greater today than ever before, while conservation methods are still improving rapidly. Also, methods of synthesizing oil from coal are being developed.

RE PROFITABLE BRAKE SERVICE by GREY-ROCK



5. Tie in with Grey-Rock's ads to the big audience of Sat. Eve. Post, Collier's, Life, and Time.



7. Reline with famous Grey-Rock Balanced Braksets for quick, quiet, smooth stops and long wear. Use the whole Grey-Rock line.



6. Tell people about your brake service. Grey-Rock provides imprinted mailings and metal signs.



8. Make new profits and new customers — with Grey-Rock and N.S.C.* standards. See your Grey-Rock jobber.



R BALANCED BRAKSETS

UNITED STATES ASBESTOS DIVISION
of Raybestos-Manhattan, Inc., MANHEIM, PA.
BRAKE LININGS • CLUTCH FACINGS • FAN BELTS
AUTOMOTIVE HOSE • RELINING EQUIPMENT

MORE BRAKE JOBS—MORE MUFFLERS

(Continued from page 36)

to the other, with all the necessary kits to overhaul carburetors and for carburetor service.

"When people drive into your service station they notice these things," explained Fred W. Jones. "It makes a lasting impression. It installs immediate confidence. It looks just as sanitary as a modern hospital. They notice that everything is clean and nicely painted, with up-to-date equipment. All the service men are in white uniforms and they keep clean.

Any soil which shows up on them is cause for immediate change.

"Even the lubricating rack is spotlessly white and clean. You cannot find a grease spot around the place.

"People driving in here know they can get anything that an automobile requires in the way of service or parts. They never ask themselves, 'I wonder if they have it?'

"We have gas pumps on both sides of the driveway so that we can catch cars coming and going without hav-

ing to back around or twist and squirm to have their gas tank filled. We carry 200 gals. of oil at all times and have every grade of oil that a man can want. We do this because we want to have it in stock if a man wants it. We carry a complete line of fan belts, fuel lines, battery cables, radiator hose and complete line of anti-freeze, etc., and sell accessories.

"If we see a man needs anything such as his hose being bad or he needs a heater we can sell it. We try to keep a man's car in good running condition. If we see it needs something we make a note of it and tell him, and what is most important in garage operation we have our eyes constantly open to needs. And we don't use high pressure. We tell him and that he can buy it from us or elsewhere, as he prefers. The chances are he buys from us."

Jones has been in the garage business for many years and he has a following of high class cars, such as the Cadillac and LaSalle owners. His trade comprises many Congressmen and Senators, ranking diplomats, Army and Navy people, and high Government officials.

His customers can drop in at any time and have a thorough check-up for safety and it doesn't cost them a nickel unless something is out of whack.

"We designed this garage so that all mechanical work could all be done on the first floor and we and the car owner can watch everything done that he wants done if he wants to do that," Jones explained. "As you drive in you have a complete tune up on the left and a lubrication rack on the right; next is the mechanical work; next two lanes for brake work; next front end, machine straightening, axles (camber and caster).

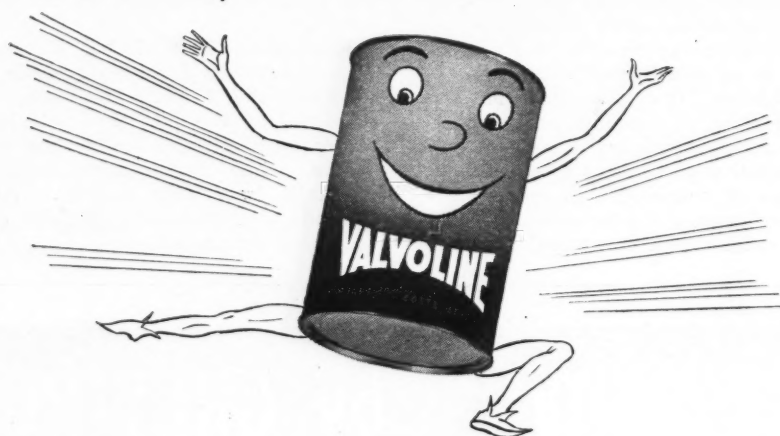
"If a man comes in and wants his car checked up so he can go through official Government inspection without any trouble, here it is. We check his front wheel alignment, headlights, etc."

Macy Teetor Is Composer

Macy O. Teetor, chairman of the Perfect Circle Engineering Committee, is the composer of a new song hit, "I Saw You First," which has just been published and promises to be a best seller. Teetor, whose hobby is music, also produced the famous song "Lost" which led the field in popularity a few years ago.

Teetor's newest song was one of nine chosen for recognition by an advisory board of the Song Hit Guild composed of Paul Whiteman, Guy Lombardo, Billy Rose and Kay Kyser. The words were written by Mack David, a professional lyricist of New York, and the publishers are Santly-Joy-Select, Inc. The composer has already received advance royalties and the usual regulation songwriter's contracts.

"FREE, WHITE and 75!"



No Wonder the First Pennsylvania Oil Is Celebrating!

Valvoline is just about the *livest* 75-year-oldster you'll ever see! Three-quarters of a century have brought prestige and rich stores of experience to the leading *independent* refiner. But the world's *first* petroleum lubricant is still first in pioneering, too.

Now—FIRST AGAIN!

Soon we announce another Valvoline triumph, to mark our Diamond Jubilee Year. Be ready for it. Like every "famous first" of the oil industry's great pioneer, it means

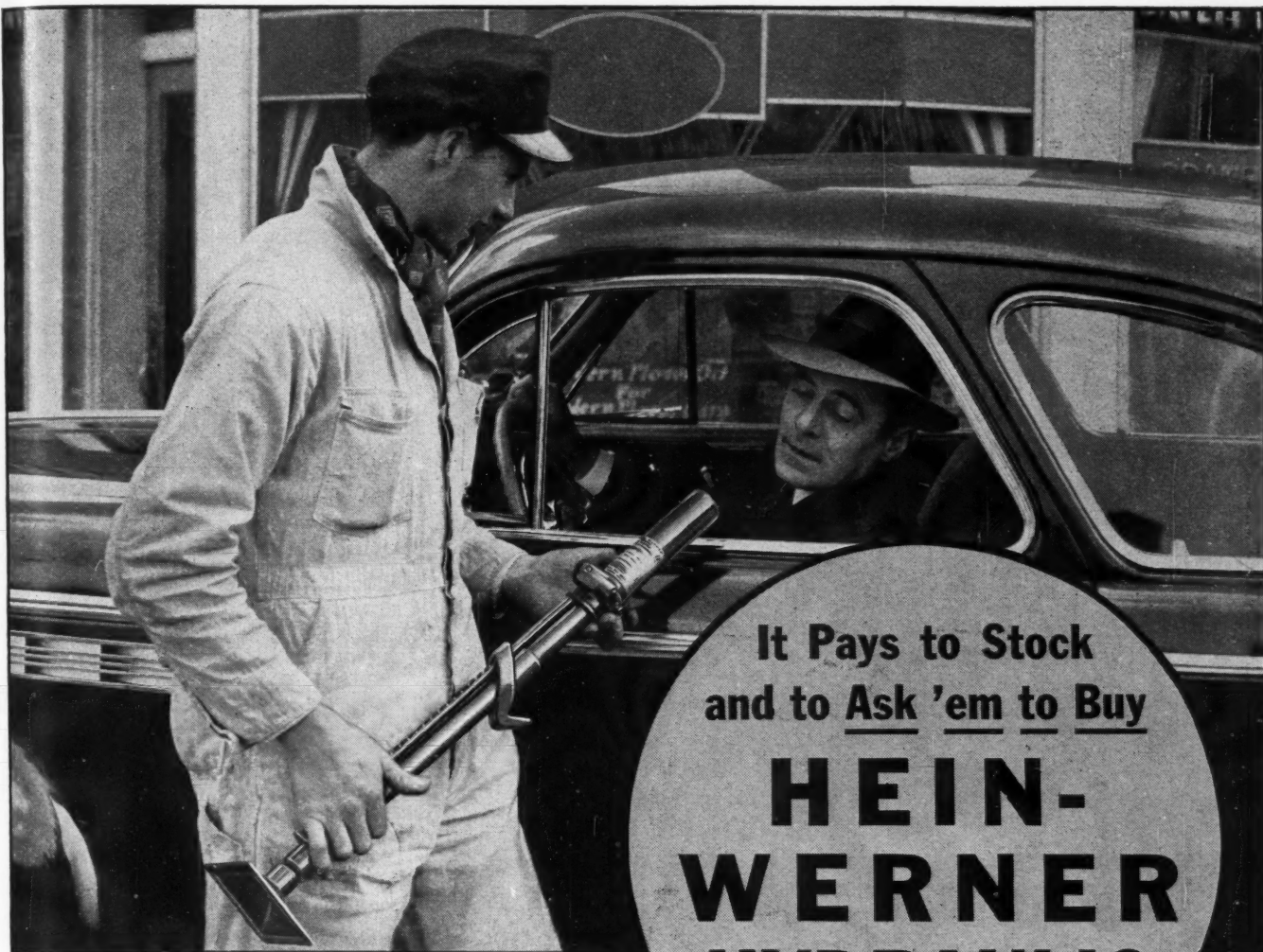
more sales for every Valvoline dealer! Write or wire today and *celebrate with us.*

Costs more to make—costs less to use



VALVOLINE

VALVOLINE OIL COMPANY, 540 East 5th Street, Cincinnati, Ohio.
New York • Chicago • Atlanta • Los Angeles • Refinery in Pennsylvania



It Pays to Stock
and to Ask 'em to Buy

HEIN- WERNER HYDRAULIC JACKS

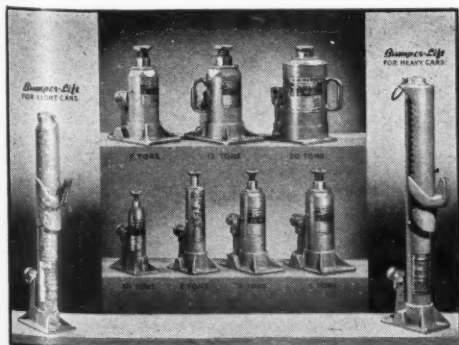
**Practically every owner
of a car or truck is a
good prospect**

YOU have an enviable opportunity to make quick, easy sales and enjoy greater profits by featuring Hein-Werner Hydraulic Jacks.

Very few cars or trucks have a hydraulic jack, and when a driver does have to change a tire or put on chains, he sure would appreciate having a H-W Hydraulic Jack.

It's easy to sell these super-powerful, easy-operating hydraulic jacks. Just STOCK 'EM... SHOW 'EM... and ASK 'EM TO BUY. A one minute demonstration is very convincing. For example, take the Model 1.30 Bumper-Lift, illustrated above and at right. Show it to a "prospect." Get him to hook it under the bumper arm of his car. The fact that he can *stand up* to position and operate this jack is sure to make a hit. So will the ease of operation. And the low price clinches the sale. TRY IT—and you'll be amazed at the results.

Model 1.30 Bumper-Lift lists at \$5.95. Dealer price is only \$4.45. (West Coast list, \$6.45. Dealer price, \$4.85).



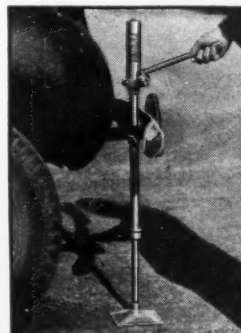
A COMPLETE LINE of CAR and TRUCK JACKS—Built Right and Priced Right

The complete line includes four models of Bumper-Lift Jacks for passenger cars, and under-the-axle type car and truck jacks of 1½, 2, 3, 5, 8, 12 and 20 tons capacity.

Hein-Werner also makes a full line of Service Jacks of 1½, 1, 2, 3, and 4 tons capacity, and SAFE-T's (non-adjustable horses) of 5 and 10 tons capacity.

For details and latest prices, ask your H-W jobber, or write us

HEIN-WERNER MOTOR PARTS CORP.
Waukesha, Wisconsin



The Million Little
Imps of Friction...
enemies of efficien-
cy and economy.



FRICTION

THREW MANY
A MONKEY
WRENCH...

..UNTIL **SKF** THREW
OUT FRICTION

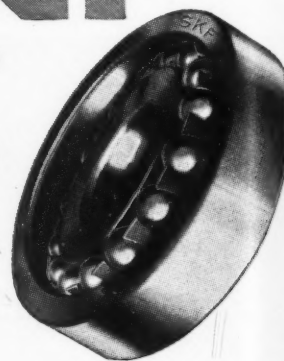
Friction and destructive vibration can throw a monkey wrench into the working parts of trucks and buses you repair... knock the teeth out of gears... run up costs... cause more discontented customers than any one thing. So stop Friction dead in its tracks by using **SKF** Bearings for replacement. The use of **SKF**'s means customer satisfaction, and customer satisfaction means *more business*. A well-stocked **SKF** source of supply near you is at your service.

SKF INDUSTRIES, INC., PHILA., PA.

SKF

4755

BALL AND
ROLLER
BEARINGS



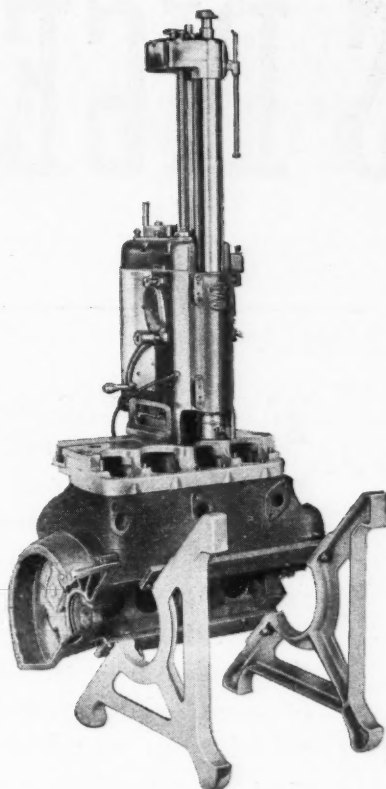
New Lubrication Manual

The 1941 Chek-Chart Passenger Car and Truck Lubrication Guide, just off the press, has been designed to give authentic lubrication reference data, and a sure-fire merchandising manual to step-up the sale of lubrication and related services. There are 192 pages of lubrication instructions and factory-approved diagrams contained in the new Chek-Chart edition, covering all passenger cars for the past six years and popular models for seven years. All popular light trucks are covered in a special 24-page Truck Section, which includes models built in the last six years.

Published by The Chek-Chart Corp., Chicago, the new 1941 Chek-Chart is priced at \$12.00 each, f.o.b. Chicago, and includes 12 monthly lubrication bulletins which keep the user up to date on all changes.

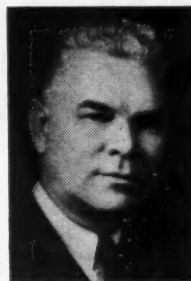
Storm Equipment for Engine Rebuilding

The Storm Mfg. Co., Inc., Minneapolis, Minn., has developed complete equipment for precision boring and sleeving of all Ford V-8 engines, with valves and studs left in the block. The equipment consists of the Storm Mileage-Master boring bar, motor plates for boring with studs and valves in the block, and a V-shaped motor stand for holding the block rigid. The boring



bar bores the cylinder in one straight smooth cut, and is equipped with a depth gage to control the depth of the cut for flange, and a special cutter for chamfering the cut for flange.

Made Aluminum Industries S-M



R. E. McGill

Robert E. McGill, since 1927 West Coast Manager of the automotive replacement parts division of Aluminum Industries, Inc., Cincinnati, Ohio, has just been appointed sales manager, with headquarters in Cincinnati, according

to a recent announcement by officials of the company. McGill, a native of Memphis, Tenn., began his career in the after-market industry 20 years ago, when he became engaged in the manufacture and sale of parts in California. From 1922 until 1927, when he joined the San Francisco office of Aluminum Industries, McGill was associated with the Diamond Motor Parts Co., a company which was absorbed by Aluminum Industries, Inc.

Expands Balanced Brakset Line

Grey-Rock Balanced Brakset line has been expanded to include several additional drilled and countersunk sets and also several multi-coverage drilled sets for Bendix Shoes. Grey-Rock Balanced Braksets are made by the United States Asbestos Division, Manheim, Pa.

Check \$ for \$



Compare the number of cylinders . . . the size of the tank . . . the pumping speed . . . the quieter operation . . . the freedom from vibration . . . easy belt adjustment . . . constant motor alignment . . . convenient location of tank drain . . . simplified over all design—and you'll know why you can buy more for your dollar in a PAR!

By Comparison — You'll Buy

PAR

MODERN EQUIPMENT CORP.
DEFIANCE, OHIO, U.S.A.

"HOW TO BUY AN AIR COMPRESSOR" . . . a fact-filled catalog and check list — is yours for the asking. Write for your copy today!

JOBBER'S DIGEST of the

FOLLOWING is a brief digest of important articles appearing in this issue of MOTOR AGE. Read the digest and discuss the service procedure with your customers:

CLUTCH SERVICE

To eliminate all guesswork and "come backs" from clutch service, you should read this article which gives the details on servicing and adjusting one of the popular makes of clutches.

WHICH GETS MORE LUBRICATING JOBS?

This is the shortest and most powerful article ever printed on the necessity of having modern equipment in the lubrication department. It's one that the jobber salesman will want to carry with him when he makes his calls, for it tells the whole story in two dominating pictures.

BODY MAINTENANCE



Each year shows a tremendous increase in body service and to do a real job requires special tools and equipment. This article gives a pictorial low-down on Nash body service.

THERE'S NO MYSTERY IN FAST CHARGING

Almost overnight fast chargers have leaped into prominence. This article is one which your salesmen will need to study to keep up with the latest developments in this trend.

MAGNETISM AND TUNE UP

The basis of almost all electrical analyzing equipment and, for that matter, ignition systems, is magnetism. This story gets right down to fundamentals and tells you how magnetism works.

FLAT RATING TWO SPEED REAR AXLES

Three pages of pictures illustrating a step-by-step procedure on how to

EVERYWHERE there is evidence of a bigger maintenance market. America's needs grow greater by the day . . . cars are being used more . . . extra miles are being driven. And, when cars are used more, the inevitable need for all kinds and all classes of automotive service is immediately evident.

Motor Age is published for the exclusive use of men who maintain the 30,000,000 motor vehicles on our highways. These maintenance men are your best customers!

To know what your best customers are thinking about, talking about, we suggest that you read their favorite business magazine — Motor Age. It will help you to help them. It will help your salesmen in their daily trade contacts. Here, then, is an especially prepared digest of the February issue to give you the highlights of many of Motor Age's service features. Why not discuss these ideas at your next sales meeting!

service this all-important unit, which incidentally uses a great number of roller bearings.

RADIAL ENGINE SERVICE

The second in the series of National Defense articles designed to acquaint the automobile service men with the construction and maintenance of mechanical equipment used by the armed forces of the country. This one covers disassembling the Pratt & Whitney Wasp Twin-row radial engine used in air service.

WHEEL ALINEMENT

A detailed, step-by step procedure for checking and adjusting the front wheel alignment on the new Plym-



outh, and describing the new eccentric, threaded camber adjusting bushing which is adjusted by use of a special wrench. Your salesman can use this story as an introduction to the sale of wheel aligning equipment.

GRAHAM-BRADLEY TRACTOR

Farm tractor service is becoming more and more the job of the automobile repair shop. This story tells how to split the Graham-Bradley tractor into two parts so that the transmission and differential can be removed for overhauling. A timely story to keep shops busy during the winter months, it opens up a new field for the jobber in the sale of parts and special equipment.

February MOTOR AGE

WIDE OR NARROW RIMS?



This is a digest of papers presented at the annual meeting of the Society of Automotive Engineers on the subject of increasing the tire rim width for passenger cars. This is a subject of vital interest to suppliers, and your salesmen will want to know what is being done along this line so that they will be prepared to discuss this activity with their customers.

SUPER SERVICE

Super service is a method of doing business—applicable to all types of retail automotive outlets. By establishing constant contact with the automotive consumer, the service retailer not only sells gas and oil, lubrication and other quick service customers—but lays a foundation for sales of other types of service, up to and including major overhauling. Spotlight is focused on a Detroit outlet, this month. Method is studied and details outlined.

BRAKES AND MUFFLERS



Pull a wheel to check the brake; inspect the muffler when the car is on the lubrication lift. That's how a serviceman in Washington, D. C., provides himself more brake jobs and muffler installations. That's how others can do it, too!

READERS' CLEARING HOUSE

For years, this regular feature has supplied answers to servicemen's questions. It's fundamental and down-to-earth in its discussion of every day service procedure. Take advantage of this department of information by acquainting yourself with some of the topics written about. It may lead you to a greater understanding of the service trade's needs.

AS ISSUE FOLLOWS ISSUE, MOTOR AGE DEALS WITH ALL BRANCHES OF SERVICE WORK AND ALL SUBJECTS OF DIRECT INTEREST TO SERVICEMEN.

HOW'S BUSINESS

A MONTHLY REPORT ON MAJOR ITEMS BY 500 JOBBERS

JANUARY, 1941

NATIONAL TOTAL	Good	Fair	Poor	NATIONAL TOTAL	Good	Fair	Poor
ACCESSORIES	Fair			SHOP EQUIPMENT	Fair		
Abrasives.....	52	102	24	Battery Charging Equipment.....	42	97	42
Anti-Freeze.....	128	74	27	Car Lifts.....	2	69	114
Car Radio Sets.....	7	42	70	Car Washers.....	7	32	150
Car Radio Accessories.....	3	56	89	Compressors.....	20	72	72
Chains.....	82	52	114	Drills (Electric).....	41	92	54
Heaters.....	70	109	45	Electric Testing Equipment.....	30	82	57
Horns.....	12	62	100	Jacks (Garage).....	49	117	29
Lacquers.....	56	92	32	Lubricating Equipment.....	39	101	59
Oil Filters.....	73	82	96	Paint Spray Equipment.....	19	109	79
Oils and Greases.....	30	89	41	Tire Service Equipment.....	8	40	90
Polish.....	19	130	48	Tool Kits and Sets.....	12	92	31
Seat Covers.....	12	124	37	Valve Refacers.....	4	51	121
Thermostats.....	119	49	36	Wheel Aligners.....	13	49	99
REPLACEMENT PARTS	Fair			Wheel Balancers.....	20	48	107
Axle Shafts.....	14	74	92	Safety Testing Equipment.....	3	39	130
Ball and Roller Bearings.....	59	28	132	Welding Equipment.....	18	65	91
Brake Lining.....	86	114	30	TIRES	Fair		
Bushings.....	47	99	71	Casings.....	10	52	20
Chains (Timing).....	4	87	101	Tubes.....	9	74	13
Clutch Plates and Parts.....	54	99	127	ELECTRICAL UNITS	Fair		
Fan Belts.....	68	101	127	Armatures.....	40	130	21
Gaskets.....	135	56	14	Batteries.....	150	27	3
Gears (Rear Axle).....	23	114	69	Cable (Battery).....	104	39	0
Gears (Transmission).....	24	135	42	Coils.....	65	119	94
Mufflers.....	164	70	10	Other Ignition Parts.....	91	121	20
Pistons.....	52	130	29	Fuses.....	39	172	10
Pins.....	47	122	32	Ignition Wire and Cables.....	87	156	27
Rings.....	92	55	55	Lamps.....	106	121	5
Radiators and Cores.....	5	72	98				
Spark Plugs.....	105	97	3				
Springs (Chassis).....	30	90	59				
Valves.....	47	132	13				
Water Pump Parts.....	124	40	41				
Engine Bearings.....	120	54	12				

MOST ACTIVE LINES

Position of Leaders	Jan. 1941	Jan. 1940	Feb. 1940	Position of Leaders	Jan. 1941	Jan. 1940	Feb. 1940
Mufflers.....	1	3	1	Rings.....	11	12	6
Batteries.....	2	2	9	Other ignition parts.....	12	14	11
Gaskets.....	3	6	3	Ignition wire & cables.....	13	16	16
Anti-freeze.....	4	1	..	Chains.....	14	18	..
Water pump parts.....	5	5	10	Oil filters.....	15	19	7
Engine bearings.....	6	4	2	Heaters.....	16	13	..
Thermostats.....	7	7	..	Fan belts.....	17	15	12
Lamps.....	8	11	8	Coils.....	18	20	17
Spark plugs.....	9	8	5	Ball & roller bearings.....	19	17	14
Battery cables.....	10	10	13	Clutch plates & parts.....	20	9	4

HOW ITEMS ARE RATED

"Most Active Lines" are chosen on the basis of the highest number of jobber reports indicating "Good" for the items selected among the twenty most active lines. "Activity" as used here has no bearing on volume, so the lists should not be interpreted as meaning the lines on which jobbers are enjoying the greatest volume. Most active lines are those which the greatest number of reporting wholesalers indicate are selling "considerably above normal" in their particular markets.

HOW TO READ THIS CHART

Information from which this chart is compiled is obtained monthly from a selected list of 500 wholesalers. Figures show the number of wholesalers reporting. Normal is taken as average sales for this month during the past few years.

Good—Sales considerably above normal.
Fair—Sales slightly above or below normal.
Poor—Sales noticeably below normal.

AN INSURANCE MAN TAUGHT US HOW TO SELL BATTERIES

By R. H. McLean

CITY TIRE & BATTERY CO., DALLAS, TEXAS



Some years back, a little girl tripped on the air hose one day, skinned her knee and went home crying. "Suppose," I thought, "she had broken her leg, suppose papa concluded to sue, suppose the jury gave her \$5,000?" So I decided to look into public liability insurance and because Pemberton had been calling on me for a year and a half, I gave him a ring.



After I'd signed the application, I said, half joking, "Maybe you want to take the premium out in trade—how about a new battery?"

"Might—if I need one. How was it last time you looked?"

Well, I hated to tell him I had *never* looked at it. I started to take up the floor boards.

"Oh, excuse me," said Pemberton, "You see, in insurance you have to keep a card record of every prospect, and I thought maybe you did the same. I guess I'm a little card conscious."

"Maybe I'm not card conscious enough," I replied, thinking of the card system that National had recommended I use.



"Oh, they help," went on Pemberton apologetically. "The first time I called on you, I got the dope on your insurance set-up, put it on a card and kept it up to date. You weren't ready to buy, but I kept calling so that when the break came you would think of me first."

"And I did, sure enough."

"I found long ago that nobody *wants* to buy insurance. They wait until they're up against it and then turn to someone they have confidence in. I imagine they buy batteries the same way—but here, *I'm* telling *you* how to run your business!"

I was just reading the last cell. "Your battery is OK," I said.

"Well, that's too bad—I mean I'm sorry we can't make a deal today. But when I *do* need a new one—"

"You're coming here to get it," I cut in, "because I'm going to make you think of me first."

That's when I began our Customer's Record System in earnest. We make a special effort to check batteries, we write down the age and condition and from that we can estimate pretty accurately when a new one is going to be needed. Thus we can start working on our prospects well in advance. A little quiet selling, plus the good service we render, usually brings the sale home to roost.

It took a year to sell Pemberton and then I felt like giving him a battery free. I don't know where else to put the credit for doubling our battery sales that year.



NOTE: Wrote Mr. McLean recently, "Frankly, we weren't really in the battery business until we got the National line six years ago. We quickly discovered how much National leadership meant to us in sales and profits . . . Spun-Glass types are mighty helpful in raising our average unit sales" . . . For your free copy of National's Sales and Service Plan, write National Battery Company, Dept. F29, St. Paul, Minn.

NOW . . . COMPETITIVE PRICES ON KATHANODE. Two genuine Kathanodes with famous spun-glass construction, 36-month and 27-month guarantees, are now in National line—batteries famed for extra long life, yet priced no higher than the best that competition can offer.

WANTED

SHOP AND SERVICE STATION OWNERS

to share in
\$6,000,000,000
worth of service,
parts and
accessories sales

This Means You

Offer your customers ARP financing terms for repairs or re-conditioning and get two or three times as much business. **YOU** sell them **PARTS**, **LABOR** and **ACCESSORIES**. **YOU** get **YOUR MONEY** on the **LINE**. They get up to twelve months to pay, on easy terms, at **low cost**.

The *Automobile Reconditioning Plan* is a new Commercial Credit service for the automotive trade. It is making a hit from coast to coast—with car owners—with shop owners. Ask your jobber about it, or write Dep't ARP.



COMMERCIAL CREDIT CORPORATION

*Let's
"Talk
Turkey"*
**ABOUT
TRACTORS**



After all, there's really no need for your sales to stop when you sell a farmer a car or a truck. For, most likely, he's a prospect for a tractor, too.

That's why Oliver says that "sell all three"—cars, trucks, tractors—is a good proposition for you. And it can be a mighty profitable one if you choose to sell the sturdy Oliver line.

This fast-moving Oliver tractor line of 9 models is headed by the streamlined, low-priced Oliver 60 that out-demonstrates any tractor in its class. Every Oliver model has the sort of power, pep, performance and stamina that makes it easy to sell.

Make up your mind that during 1941 you're going to sell **three** profitable items instead of two. Determine today how well these sturdy Oliver tractors fit into your sales, service and repair setup.

Then, before someone else signs up for your territory, investigate the details of the liberal Oliver contract: Oliver's aggressive field sales assistance and the quality of Oliver power farming equipment.

Write today to the address below for complete franchise information.

SELL ALL 3
CARS-TRACTORS*-TRUCKS
***STURDY OLIVER TRACTORS—OF COURSE**

OLIVER

FARM EQUIPMENT SALES COMPANY
400 WEST MADISON STREET • CHICAGO

HERE'S WHAT YOU GET—WHEN YOU USE DURO SPECIAL TOOLS *for FORDS*



Speed

By using these special tools for Fords you speed up your work. You end time losses which come through working with tools not made especially for a specific job. Saves you valuable time.



Ease

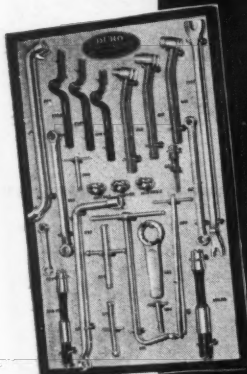
Easy access to tight places. Performs difficult operations readily. Lightens your work. Simplifies the job.



More Profit

Turning out more jobs per month increases your income per day, meaning your income for the year is greatly increased. Thus these tools not only make you more money, but pay for themselves.

Better Work



The quality of your work is reflected by the tools you use. Here is what you get in Duro Special Ford Tools: Brake adjusting, Main bearing wrench, Valve bushing punches, Shock absorber wrenches, Head and manifold wrench, jet wrench, Piston pin tools, Cotter hook, Drain plug wrench, Insert tool, Carburetor jet tool, Connecting rod wrenches, Valve tool, and 6 and 12 point sockets. Once you use these tools you'll wonder how you ever managed without them. They can be had with or without the display board. Sold as individual tools or complete sets.

See these Duro-Chrome displays at your jobbers, or send for catalog.

DURO METAL PRODUCTS CO.

Dept. MA-1, 2649 N. Kildare Avenue
Chicago, Illinois

WHEN IT'S MADE BY DURO IT'S RIGHT

EVERSEAL

REG. U. S. PAT. OFF.

1940 BIGGEST YEAR in EVERSEAL HISTORY



U. S. Pat. No. 1986694

Recommended by: LIBBEY-OWENS-FORD GLASS CO.—PITTSBURGH
PLATE GLASS CO.—AMERICAN WINDOW GLASS CO.

EVERSEAL PRODUCTS CO.

3822 HAZELWOOD AVE. • DETROIT, MICH.

EVERSEAL Glass-Setting Material

The World's largest selling! Used by Dodge, Hudson, Packard, Ford—all of them—AND the big airplane plants—AND the U. S. Government.

- 1—Only Hand Pressure Needed
- 2—It Swells After Setting
- 3—Makes a Perfect Seal
- 4—Prevents Glass-Setting Breakage
- 5—Cuts Handling Costs
- 6—Easy to Use on All Jobs

DAN, THE RUBBER MAN, SAYS:



100% SAFE!

RUGLYDE penetrates the tightest fittings... furnishes a tough, viscous film which lubricates and preserves rubber. Contains *dag Colloidal Graphite. Lasts the life of a lube job.

Safe on Service Man! Non-flammable — non-poisonous.

Safe on Car Finishes! Won't harm the finest lacquers.

Approved by leading oil companies and rubber manufacturers for rubber parts. Sold by your jobber in 8-ounce refillable dispensers and in gallons.



For rubber door seals, hood lacing, and other parts requiring surface lubrication — use Door-Ease Stainless Stick Lubricant. Won't soil clothing or upholstery. Won't harm rubber or car finish.



AMERICAN GREASE STICK CO., MUSKOGON, MICH., U. S. A.

Canadian Sales Representatives

COLONIAL TRADERS, Ltd., 144 FRONT STREET W., TORONTO

MOTOR AGE

—is a publication keyed directly to the needs of the maintenance field. Built on the requirements of the serviceman. Edited by Bill Toboldt. Read it every month.



A Chilton Publication

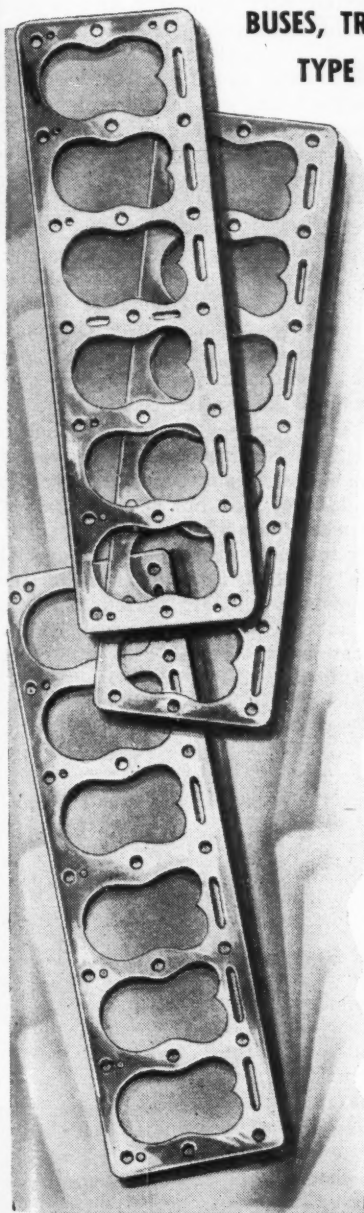
CHESTNUT AND 56TH STS.
PHILADELPHIA, PA.

FITZGERALD

THE COMPLETE GASKET SERVICE



GASKETS FOR PASSENGER CARS,
BUSES, TRACTORS—FOR EVERY
TYPE OF INSTALLATION



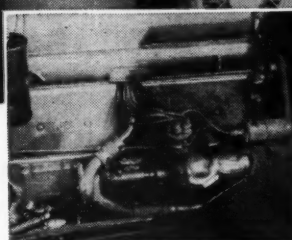
Gaskets of highest quality—made from finest materials—of all approved types of construction. Gaskets for every need, including the famous Fitzgerald Bulldog Gasket—a tougher gasket for a tough job—best for heavy duty service and high compression motors.

Tie up with Fitzgerald, not only for better gaskets, but also for sales and merchandising helps—including display material, racks, cabinets and board assortments. Your jobber will give you 100 per cent cooperation . . . The Fitzgerald Manufacturing Company, Torrington, Conn. — Branches, Chicago and Los Angeles — Canadian Fitzgerald, Limited, Toronto.

FITZGERALD GASKETS

THE COMPLETE LINE THAT COMPLETELY SATISFIES

STEAM CLEANED
USED CARS
Bring
\$15 to \$50 MORE



Cleaning motor block with Hypressure Jenny. Easy, inexpensive to operate, and portable.

Typical engine block, partly cleaned. Note thoroughness of job! Time per motor 10 to 15 minutes.

HYPRESSURE JENNY

the Profit-Making Steam Cleaner
CLEANS THEM LIKE NEW!

That fine, sleek appearance that brings \$15 to \$50 more for reconditioned cars, results from steam cleaning first with Hypressure Jenny. Hundreds of Dealers are getting bigger profits and quicker turnover by making Hypressure Jenny Steam Cleaning the keystone of their reconditioning program. Hypressure Jenny also does profit-service jobs such as chassis and motor cleaning; and cleans auto parts, floors, pits, runways, windows, etc. Give us a few facts on the coupon below, and see how much extra profit Hypressure Jenny can bring you.

HOMESTEAD VALVE MFG. CO.
P.O. BOX 95 CORAOPOLIS, PA.

SEND FOR THIS
FREE SURVEY
TODAY!

SURVEY

O. K.—Send that Survey.
We recondition, repaint, repair . . . cars or trucks monthly.
We employ . . . mechanics on dirty, greasy repair work.

NAME

ADDRESS

Clean Floors Right and Save Plenty in The Bargain



GET THE FACTS THAT PROVE IT

Write for your copy of this new collection of performance data in which users of Magnus Cement Cleaner and other Magnus Automotive Cleaning Specialties tell about the results they are now getting compared with previously used methods and materials.

Oily, greasy floors and driveways are dangerous, needless - - and mighty poor advertisements for you.

Get 'em clean and keep 'em clean - - really clean - - - with

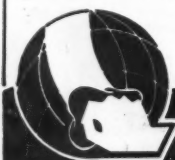
MAGNUS CEMENT CLEANER

It is not only easy to use and easy on the cement surface. It actually adds service life to your floors and whitens them as well as hardening them. You get cleaner floors than you ever had before and you save plenty in the bargain, because the reported experience of users is that Magnus Cement Cleaner goes two to four times as far as ordinary cleaners.

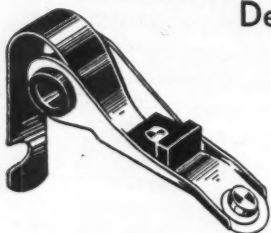
Remember that it is safe. There's never any excuse for using dangerous gasoline for floor cleaning.

MAGNUS CHEMICAL COMPANY

Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps,
Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants.
36 South Avenue Garwood, N. J.



MAGNUS CLEANERS



Designed for Efficient, Lasting Service . . .

The TUNGSTEN SUPER CONTACT POINT

Product of skilled engineering . . . highest quality materials . . . accurate construction . . . this is the TUNGSTEN SUPER CONTACT POINT. Modern high-speed, high-compression engines throw greater strain on contact points, causing pitting and overheating. With the 60% greater disc area of TUNGSTEN SUPER CONTACT POINTS, overheating and pitting are eliminated, heavier amperage loads can be handled safely. The superiority of the SUPER CONTACT POINT over the regular point affords easier starting, smoother performance and a longer service life.

Write today for complete details.

Other PRODUCTS by TUNGSTEN

Brushes
Bushings
Coils
Condensers
Cutouts
Distributor Parts
Gears
Horn and Light Relays
Magneto Parts
Starter Parts
Switches
Voltage Regulators
Miscellaneous Parts



TUNGSTEN CONTACT MFG. CO.
NORTH BERGEN, NEW JERSEY

MAGNETISM

(Continued from page 31)

"The other school of thought has the idea that magnetism is something that surrounds the metal, and with this in mind they are trying to increase the surface area of a given chunk of metal by grinding it into little pieces and then cementing it together with some other compound. The magnets that operate the speedometer hands in some of your 1940 and 1941 cars are made up of this granular metal, and we'll see how it works out of we have a little patience."

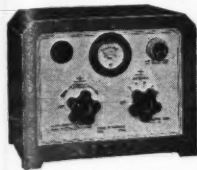
Sam picked up an old pump shaft from the bench and held it up. "This steel bar isn't a magnet as you see," he said as he dipped the end into a box of lockwashers. "Not a single washer sticks to it. Here, Archie, take a hacksaw and cut it in two lengths." Archie Roe sawed the shaft and handed the two equal lengths to Sam. The boys watched as he wound a few dozen turns of wire around one of the pieces. He then touched the two ends to the posts of a battery, flashed the connections several times and then slipped the steel shaft out of the coils of wire. He next dipped the end of the shaft into the lockwashers and held it up. About a dozen washers dangled from the end of the shaft. See Figure 2.

"There you see how a magnet is made," he resumed. "Both halves of this old pump shaft are exactly the same kind of steel but now one-half of it is a magnet while the other isn't. Many magnets are made of a special grade of steel that will retain the magnetism for longer periods, but you can make any piece of steel into a magnet by putting it into the right kind of magnetic field. I'll give you one more example showing how you can take—say a screwdriver—and magnetize it, and then take the magnetism away just as easy. Come on over to the shop growler and I'll demonstrate."

The boys followed the boss to the armature growler. He picked up a screw driver and tried it among the lockwashers to prove it had no magnetic characteristics. Next he placed the screw driver blade across the jaws of the growler and turned on the current for a moment. He snapped the current off, removed the screw driver and stuck it among the washers. Like the pump shaft it picked up a dozen or so. Without speaking, Sam turned the growler switch to the "on" position, passed the screw driver blade through the vee of the growler, then snapped off the switch. Another jab of the blade among the washers proved that every trace of the magnetism had vanished.

"So you see," Sam commented, "the screw driver picked up magnetism when I put the blade on the growler and left it there until after I turned

NEW! ANNOUNCING VALLEY SUPERDUTY CHARGERS



Fully Guaranteed for Two Years—Valley modernized superduty chargers will give you the utmost in value... enable you to cash in on the big profits in battery charging. Valley chargers are easy to operate... no moving parts... connecting to the lighting circuit. Low in operating cost.

Model SG-12 charges 1 to 12 6 volt batteries—\$28.00.

Valley Electric Corp.

4221 Forest Park Blvd. • St. Louis, Mo.



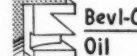
Sell and Install
Drān-Bac



"H"
Special Sets



Profitable
because they
stay sold



The Wel-Ever Piston Ring
Company
Toledo, Ohio

WEL-EVER

THE DE LUXE HORN



Increases driving security through certainty of being heard.

SOUND RANGE 1 TO 10 MILES
THE LIFETIME HORN

Write for literature.

BUELL MANUFACTURING CO.
2973 Cottage Grove Ave., Chicago, Illinois

TAPERED ROLLER BEARINGS

Tyson

ROLLER BEARING CORP.
MASSILLON, OHIO

Make Big Profits on Small Investment in

SHURHIT IGNITION PARTS



Ask your Shurhit jobber or write us for details on General Ignition Assortments of fast-moving parts...
Contact Points...
Condensers...
Rotors...
Caps...
Coils...
Switches, etc.

SHURHIT PRODUCTS, INC.
Waukegan, Ill.

the switch off. When I just passed it through the growler field before I turned off the a-c current it demagnetized it. That's what watchmakers do when they demagnetize your watch, only they charge you fifty cents or a dollar and I'm showing you free.

"A permanent magnet can be a straight bar of steel, in the shape of a horse shoe, round or almost any shape, but no matter what the shape it puts out a magnetic field. The field of a horse shoe magnet goes from end to end, like this." Sam sketched a magnet on the blackboard and indicated the flux or field with rows of dashes. See Figure 3.

"Now you fellows tell me where permanent magnets are used in automobiles and trucks," Sam requested.

"On the flywheels of Model T Fords," said Harry Wilkins.

"In speedometers," Ken Stall spoke out.

"In high tension magnetos on some trucks," said Les Jordan.

"Yes, and in ammeters," finished Sam. "All but the very best types of ammeters use a small permanent magnet. Permanent magnets aren't so very important in the operation of motor cars. We could substitute something else for them and get along very well. However this doesn't apply to electromagnets, and that's what I want to talk about now.

"Roughly speaking an electro magnet is a piece of iron or steel with a coil or wire wound around it. To become effective electricity must be flowing through the coils of wire, or in other words, the electro magnet is only a magnet while the juice is turned on. This principle is used in a lot of places in the automobile and, like I said at the beginning, we wouldn't have many cars today if it weren't for the work we can make electro magnets do for us.

"To begin with we wouldn't have our present ignition system if there wasn't an electro magnet built in the ignition coil. Incidentally the iron wire core and primary winding of an ignition coil is about as good an example of the electro magnet as we can find. Here it is here (see Figure 4) and if you ever need a pretty good magnet in a hurry to pick up something you've dropped through a hole in the floor just strip down an old ignition coil 'til you come to the main works—the primary.

"Then there's the generator," Sam went on, "each of the pole shoes and the surrounding field coil is an electro magnet, and the same is true of the armature. Each armature coil and the iron of the core that it surrounds becomes an electro magnet when the generator is charging. Then every generator cutout, or circuit breaker, works on the electro magnet principle. Your voltage and current regulator are also electromagnets. The field coils

(Continued on page 122)



The Patented

WHITE, LIQUID RUBBER THAT S-T-R-E-T-C-H-E-S

Will Not Crack, Chip, or Peel
Easily Applied With Brush...
Dries in 20 Minutes



Made solely by
R. M. HOLLINGSHEAD CORP.
Camden, N. J. Toronto, Canada
Turn to pages 70 and 71



Ask your Jobber
MOTOR MASTER PRODUCTS CORPORATION
4757 Ravenswood Ave., Chicago, U.S.A.
Expert Distribution
BORG-WARNER INTERNATIONAL CORP., Chicago

HERE'S A HORSE OF A DIFFERENT COLOR



STOP TROUBLE BEFORE IT STARTS

Handy SUPER SERVICER

Complete, FAST BATTERY SERVICE

HANDY SUPER SERVICER is a combined Tester, Booster and Quick Charger. Compact. Portable. Tests battery in 1 min.; charges automatically at tapered rate resulting in FAST, yet SAFE, charging; battery remains in car; charging rate 75 amps.; 115 or 230 volts. (Specify voltage when ordering.)

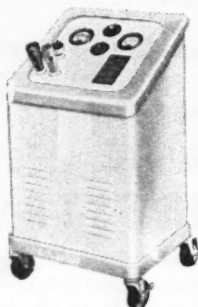
\$180.00

Complete with Bulbs, Leads and Clips.

ASK FOR BULLETIN 85

BALDOR ELECTRIC COMPANY

4375 Duncan Ave., ST. LOUIS, MO.



DON'T WORRY ROOKIE
I CAN STOP WITH MY
**SOUTHERN
BRAKE LINING**

SOUTHERN
FRICTION MATERIALS CO.-CHARLOTTE, N.C.

**MAIL COUPON
FOR Free
MONEY SAVING
CATALOG...**

WAYNE AIR COMPRESSORS

NAME.....
ADDRESS.....
CITY..... STATE.....
The Wayne Pump Co., Ft. Wayne, Ind.

in the starter motor and the starter armature are also electro magnets, and every time you have to crank a car by hand you get a little idea of what an electro magnet can do to make driving a car an easy job. Then, too, there's the solenoid starter switch. That's an electro magnet if there ever was one, and if you ever had your hand tangled around one when some damn fool pressed the button you'll know how much power they can develop. There's a lot more uses for electro magnets around the car; they're used in horns, in horn and light relays, electric gasoline gages, temperature gages, electric windshield wipers, heater fans and so on."

Les Jordan, the assistant to the boss blew out a cloud of smoke. "I'm sure glad you gave us this talk on magnets," he spoke up. "I've worked with magnets—both kinds—for years, naturally, but I think I've made the mistake of taking 'em too much for granted. You know, I never stopped to think how important they are and how much what we do depends on them. If a fellow just stops to think about what is going on in a unit—what makes the damn thing tick—he can do a lot better job of making a good repair or adjustment."

Service Equipment Shipment Increased, M.E.M.A. Shows

The current Motor and Equipment Manufacturers Assn. index, issued in January, reporting on November 1940 business, indicated that while November shipments in all divisions of the industry excepting service equipment declined seasonally below the previous month, all departments continued far above the 1939 indices.

The grand index for all branches of the industry in November declined to 183 per cent of the January, 1925, base as compared with 190 per cent for October and 135 per cent for November, 1939. Service parts shipments to wholesalers for November declined over the previous month as did accessories shipments and shipments to vehicle manufacturers for original equipment. Service equipment shipments to wholesalers in November advanced to 156 per cent of the base, which compares with 142 per cent in October and 91 per cent in November, 1939.

Bendix Field Men Meet

Zone managers and technical representatives of the service sales department, Bendix Products division of Bendix Aviation Corp., met in South Bend, Ind., recently to discuss production and marketing programs with factory officials. During the four-day session the men previewed the 1941 merchandising plans for all Bendix lines.

Meetings were presided over by C. W. Butterfield, Bendix Service Sales Manager.

MILES of SMILES

WHEN YOU

USE GENUINE

TIMKEN

BEARINGS

THE TIMKEN ROLLER BEARING
COMPANY, CANTON, OHIO

A PERMANENT SEAL with . . .



PAX-WELD

A few minutes work and cracked valve ports, cylinders, water jackets and aluminum heads are sealed permanently with PAX-WELD, without taking down the motor. Follow directions for guaranteed results.

See your jobber or write TODAY!

JOHN S. MCKENZIE
Rutherford, New Jersey

SERVICE MEN!

For quick and permanent tube repairs, J.M.D. of Freeland, Pa., prefers Speaker Ready Fuse MATCH PATCHES.

Unmatched quality and performance. Fit any clamp. Buy today from your Jobber!

SPEAKER match patches

1661 N. Water Street, Milwaukee, Wisconsin

Sign OF THE LION

Buy AT THE

Your Guarantee of Dependable Quality
Automotive Parts, Supplies and Accessories

Write for our New 1941 Muffler Catalog.

LION AUTO PARTS & MFG. CO., INC.
1920 S. Michigan Ave., 2214-20 Main St., 1239 Osborne St.
CHICAGO DALLAS MONTREAL

For Seals of Security

Industry depends on.

VICTOR

GASKETS, OIL SEALS, GREASE RETAINERS

BODY MAINTENANCE

(Continued from page 92)

ventilator handle, arm rest, door trim panel and center channel. With glass in lowered position, shift glass toward front of car, disengaging regulator arms from glass bottom channel. Remove screws holding regulator to door inner panel. Regulator may then be removed from door. To replace, reverse the procedure. To adjust, align glass to close evenly at top of door by loosening adjusting nut 2, Fig. 28. Then raise glass fully and tighten nut.

Behel and Waldie Named

Allan O. Marsh, proprietor of Master Products Mfg. Co. of Los Angeles, announces the appointment of Behel and Waldie, Chicago advertising agency, to direct his company's advertising account.

To the company's Master Counter Catalog holders and Master Method piston resizer has been added a complete line of fluorescent lighting fixtures for general commercial and industrial use, especially designed for modernizing the lighting of automotive parts, wholesalers' stores and shops, garages, automotive repair shops and service stations.

Bearing Identifier

In connection with the 1941 program covering Hyatt and New Departure bearings, United Motors Service of Detroit has developed a device to assist the parts man to identify bearings from the size of the inside and outside diameters, and assign the correct part number. It consists of a sliding chart of sizes which show through windows on the conversion table. All that is necessary is to measure the bearing to be identified, place the sliding chart with this size showing through the window, and read the part number on the table.

Moves Offices

D. H. McAdams, regional manager for automotive products of the Joyce-Cridland Co., Dayton, Ohio, has announced the removal of his Chicago office to 122 S. Michigan Ave.

Appoints Burns & Potter

Buell Mfg. Co., Chicago, makers of air horns and signals, has appointed Burns & Potter, Chicago, to direct its advertising, effective immediately.

Classified Advertisement

MANUFACTURERS AGENTS WE HAVE OPEN SOME PREFERRED TERRITORY ON A VALUABLE SHOP EQUIPMENT ITEM. FOR DETAILS WRITE BOX 703, c/o MOTOR AGE.

THE ONLY PATENTED

LEONARD

air Cooled SPARK PLUGS

in NEW Packaged Sets to fit CHEVROLET



FLAT EDGED ELECTRODES

Test Them for Strong Blue Spark

See your jobber today. If he can't supply you write us. Catalog of complete line on request.

NO MORE spark plug troubles when you use Leonard Plugs for Chevrolet replacements! This latest Leonard achievement puts an end to insulator breakage and "high speed miss."

Note the FLAT Electrodes with side spacing (not top spacing) a feature that enables this new type plug to outspark every other make. Don't take our word for it. Make your own comparative tests against any plugs on the market with gaps set at same spacing as Leonard Chevrolet "Special" (.038). You'll be amazed at the extra fatness and intensity of Leonard's blue spark!

Built with the Leonard Patented Air Cooled feature that carries off excessive heat, preventing breakage of porcelain and oxidizing of wires.


LEONARD SPARK PLUG CO., NEWARK, N. J.

TRADE MARK

NOC-OUT

HOSE CLAMPS

THE HOSE CLAMP WITH THE THUMB SCREW



For fast, dependable hose connections, use NOC-OUT Hose Clamps . . . standard in the automotive industry for many years for their leakproof, trouble-free sealing features. Quick tightening thumb screw provides equal pressure all around. Type "A" Adjustable . . . fits many hose sizes. Type GBB heavy duty, solid band for Booster Brakes. G8HH for all heater hose. Type HP for all high pressure air and gas lines. Sold by dealers and jobbers everywhere.

WITTEK MFG. CO.
4305 W. 24th PL., CHICAGO, U.S.A.

DON'T FILE POINTS!

Flex-Stone

REG. U.S. PAT. OFF.

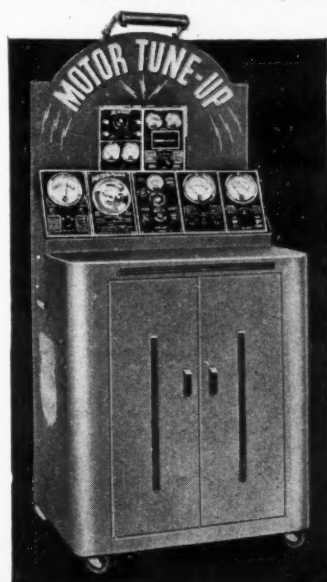
Flexible Contact Dresser

- Takes the hardest of Tungsten Points.
- Bends in where a file can't reach.
- Cleans and Dresses all Electrical Contacts.

Ask Your Jobber or Write Direct

RINCK-McILWAINE, Inc., 16 Hudson St., New York

Clinch those BIG TUNE-UP PROFITS



WITH

ELECTRO TEST EQUIPMENT

YOU don't have to watch "the other fellow" raking in the dollars from Tune-up jobs. Electro opens the gate to all. Gives you accurate, strongly built instruments for checking, timing, synchronizing, etc.—all moderately priced. The instruments you need—at prices you can afford!

ELECTRO DE LUXE TEST STAND AND BENCH. (Illustrated) Accommodates 7 instruments. Siberian gray, wrinkle finish. Designed to catch the eye of the motorist and suggest the need of tune-up. Heavy steel. Dealer price with instruments as shown, \$285.75.

OTHER ELECTRO PROFIT BUILDERS

ELECTRO "HY-AMP" BATTERY BOOSTER. Charges battery in car in 30 min. A high powered battery salesman. Dealer price, \$169.50.

TROUBLE SHOOTER. Fastest Analyzer ever built—accurate electrical check-up in 15 minutes. Makes those tough jobs easy. \$29.50.

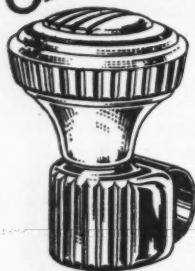
MIXTURE MASTER. Takes the guess out of carburetor adjustment. Mixture check in 3 minutes. All carburetor ranges. Portable. \$39.50.

ELECTRO PRODUCTS CO., 621 E. 216th St., New York:
Send literature and prices of Electro Testing Instruments.
NAME
ADDRESS
CITY & STATE.....D

If your Jobber can't supply you USE COUPON

Convenient Terms Can Be Arranged Through Your Jobber

Turn Right . . . To PROFIT with
Sinko's NEW SPIN-UR-WHEEL CONTROL
AND GEAR SHIFT BALL



The NEW deluxe chrome base band-type SPIN-UR-WHEEL Control by SINKO is available in 6 colored plastics. Easily attached for long, hard service.

Identical in size, shape, colors and quality is SINKO'S Matching Gear Shift Ball.



SINKO TOOL & MFG. CO.

351 - 371 N. Crawford Ave., Chicago, U. S. A.

SOAX

. . . the fastest and most efficient cleaner for carburetors, fuel pumps and automotive parts, developed by aircraft compound specialists. . . . used COLD and without equipment, and as easy as counting your fingers. Your jobber has it or can get it.

E. A. GERLACH COMPANY

3567-71 Sepviva St., Philadelphia

Branch—Christiansen-Travelletti, 202 Palmolive Bldg., Chicago

AUTOMOTIVE JOBBERS: You asked for SOAX.

SUPER SERVICE

(Continued from page 39)

service, which they assumed a year ago. This has proved a business stimulant in obtaining new customers in the neighborhood. Service calls average 300 to 450 monthly, depending upon the season, and keeps two wreckers and a service car busy.

When asked his formula for the station's success, Hilton Marcellus, elder of the brothers, said simply, "Treat 'em right. We try to be friendly with all our customers and maintain a personal relationship. All the boys in the station wear uniforms with their names over the shirt or jacket pocket to encourage customers to call us by

our first names. We also address all regular customers by name and go out of our way to see that each customer gets the best service possible. That's why we maintain a pickup and delivery service to call for cars in the neighborhood on lubrication, wash or repair jobs."

Word-of-mouth advertising has been one of the station's chief assets, although it is not entered on the Marcellus books even as \$1 for goodwill. When they opened for business, the brothers spent \$9.87 for handbills and postcards to advertise the station but satisfied customers have carried their advertising message since then. They also promote community good will by sponsoring softball and hockey teams composed of neighborhood youngsters, whom they help outfit and who, incidentally, help advertise the station with the Marcellus name on their jerseys.

Credit is extended to steady customers and accounts settled weekly or monthly. Although an honest face is the only requisite for credit extended to regular customers, bad debts have been few. Shortly after the station opened, a policeman residing in the neighborhood asked for credit and ran up a \$50 bill. Then he encountered illness and was unable to pay. Eighteen months went by before the policeman walked into the station and paid

in full. Which is one reason why the Marcellus brothers have faith in human nature.

Starting out with only themselves to operate the station, the brothers now employ seven regular and two part-time workers. The station operates on a 24-hour basis, providing additional service as well as a job for one more man.

Although they are co-owners of the station, the Marcellus brothers do not believe in sitting back behind a desk and watching others do the work. They share in all duties except the shop work and often can be found pumping gas, repairing a tire or operating a grease gun. This establishes fine morale on the part of their em-



7" PORTABLE ELECTRIC SANDER

High speed, general purpose sander. For metal finishing, removing scale and rust, smoothing welds.

THE UNITED STATES ELECTRICAL TOOL CO.
Cincinnati, Ohio

RENEW WORN FLOOR MATS At A Trifling Cost

Other Used Car Reconditioning Products

HERMITEX Rubber-Nu
Black, Brown, White
White Wall Tire Cleaner
Herm. Lustre Polish
Upholstery Cleaner

As little as 19 cents will save the cost of a new floor mat. *Hermil Floor Mat Patches* are designed to look like an original reinforcement rather than a patch. Made of live rubber with beveled edges. Back coated with adhesive rubber. Improve the appearance of your used car offers and net bigger profits. See your jobber, or write direct for descriptive matter.

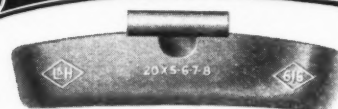
Distributors wanted for available territories.

THE HERMIL CO.

6214 West Grand Ave.

Chicago, Illinois

NOW Available for Motor Trucks!



Write for Literature

Truck tires can now be protected the same as automobile tires against "spotty" wear caused by shimmy, wobble and wheel tramp. The new L & H heavy duty weights for trucks (Patent No. 2036757) fit all sizes of truck wheels. Easy to apply and easy to remove for adjustment. Ask your jobber.

HARLEY C. LONEY CO.

16883 Wyoming

Detroit, Mich.



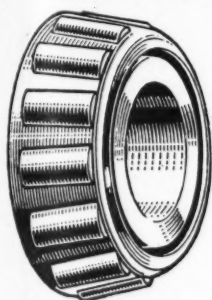
L & H Wheel Balancing Weights

SPEED COUPLER
Makes Each Air Hose Do Multiple Duty
FAST • DEPENDABLE
Ask Your ARO Jobber!
THE ARO EQUIPMENT CORPORATION
BRYAN, OHIO

NO. 210 SPEED COUPLER
PUSH ON
PULL OFF

PRATT TAPERED ROLLER BEARINGS

The Perfect Replacement



Recognized as the Standard Replacement Bearing by Jobbers and Servicemen everywhere.

ESTABLISHED 1893

WM. E. PRATT MFG. CO.
JOLIET, ILL.

Best known
WEED AMERICAN
BAR-REINFORCED
TIRE CHAINS
Easiest to sell

For running-in new and rebuilt engines use auxiliary lubricants containing "dag" Brand colloidal graphite.

Acheson Colloids Corporation

Port Huron  Michigan

*REG. U. S. PAT. OFF.

NEW SpeedWay 1/2" No. 89 DRILL

Full size, full weight, full capacity. Specially wound, high torque 115 V Universal 500 r.p.m. SpeedWay Drill Motor. Forced air cooling, oilless bearings, new natural grip breast plate and removable side handles. Streamlined die cast case. If your dealer can't supply, order direct on 10 day trial.

\$24.50

Circular Free

SpeedWay Mfg. Co., 1890 S. 52nd Ave., Cicero, Ill.

ployes and makes them well known to the customers.

The shop, which was added to the set-up in September, 1939, employs an experienced mechanic and his assistant and grosses about \$1,200 per month. It specializes in ignition, carburetor and brake work. The replacement business, especially in carburetors, is good. Engine, transmission, rear axle and clutch repair work is done, although tune-up jobs comprise about 35 per cent of the shop business. Wrecks, body repair and wheel alinement are farmed out elsewhere. Accessory sales total about \$250 monthly, although cut-rate competition reduces this figure. Shop equipment includes an analyzer, synchrograph, lathe for armatures, brake band riveter, two battery chargers with 24-battery capacity, jacks and a chain fall.

The lubrication department, which averages 200 grease jobs per month, contains three racks and two hydraulic lifts. Equipment includes an engine and gear case flusher, tire inspecting machine and complete greasing equipment. Wash jobs average 250 monthly, with one full-time worker and an assistant for the week-end rush. Twenty to 25 batteries are charged weekly. There are four gasoline pumps.

An accessory display is maintained in the front office, which is equipped with comfortable chairs for waiting customers.

Proposed N. Y. Law Would Require Damaged-Car Report

State Senator Walter J. Mahoney of Buffalo, N. Y., has announced his intention of seeking swift enactment of a state law designed to facilitate capture of hit-and-run drivers. The bill would require public garage proprietors to report to police all damaged automobiles brought to them for repairs, it is reported.

Hit-run killings invariably result in such injuries to a car as bent fenders or bumpers or broken headlights, Senator Mahoney pointed out. The proposed Mahoney bill would provide among other things:

1—That public garage owners within 24 hours after the receipt of a damaged car, shall file with the commissioner of police a report giving the name of the owner, the number of his license and auto plate, the type of damages and other vital information, accompanied by a photograph of the damaged machine.

2—That no work shall be performed on the damaged car until such report has been filed with police authorities.

3—That no damaged car shall be released for delivery to the owner until permission is given by the police.

4—That failure to file a report shall constitute a misdemeanor, punishable by a fitting penalty.

Every SHOP Every JOB

needs these modern tools to save time, increase profits, and handle work which otherwise can't be done well.

MODERN FENDERS DEMAND IT

The H-289 Perfection POWER-PLUS UNIVERSAL FENDER SPREADER

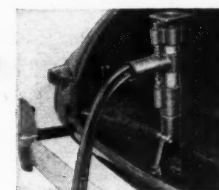


for close work where wide spreading is necessary and for spreading between fender and fender well. It pays for itself on the first six jobs. Closes to 1 3/4" and opens to 19 3/4" with 6" ram travel. Price \$14.75.

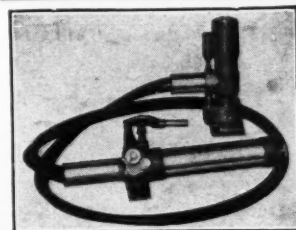


POWER IN A SMALL AREA

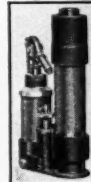
H-80 Perfection POWER-PLUS PUSH-PULL SPREADER



For use only with Perfection Push-Pull Jack. Ideal for trunks, pushing out sills, etc. Will fit into 1" space. Open width 5 1/4". Price \$8.50.



Perfection POWER-PLUS HYDRAULIC JACK



The only double-acting PUSH-PULL hydraulic jack supplies direct pull, for the repair of box channels, rear trunk racks, door posts, etc. Two units handle any type of body aligning, frame work, fender straightening, knee-action adjustment, steel running board straightening.

Advantages Include:

- Fills 100% with any amount of handle travel.
- Swivel handle allows operation in any position, even upside down.
- Immediately adjustable.
- Safety valve prevents overloading, bending or breaking.

Order from your jobber or write for catalog.

G. A. C. MFG. CO., Ashland, Ohio

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